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STEEL is published every Monday by PENTON PUBLISHING CO., Penton Building, Cleveland, O. C. J. STARK, President; J. D. PEASE, Vice President; F. V. COLE, Secretary. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association. Branch Offices: New York, 220 Broadway; Chicago, Peoples Gas building; Pittsburgh, Oliver building; San Francisco, Alto building; Washington, National Press building; Cincinnati, Schmidt building; London, Caxton House, Westminster, S. W. 1; Berlin, Lichterfeld-West, Dahlmerstrasse 64a, Germany. Subscription in the United States, Cuba and Mexico $6 per year; in Canada $8.60; in Great Britain and European countries £2:8s.

Entered as second class matter at post office at Cleveland under the Act of March 3, 1879.

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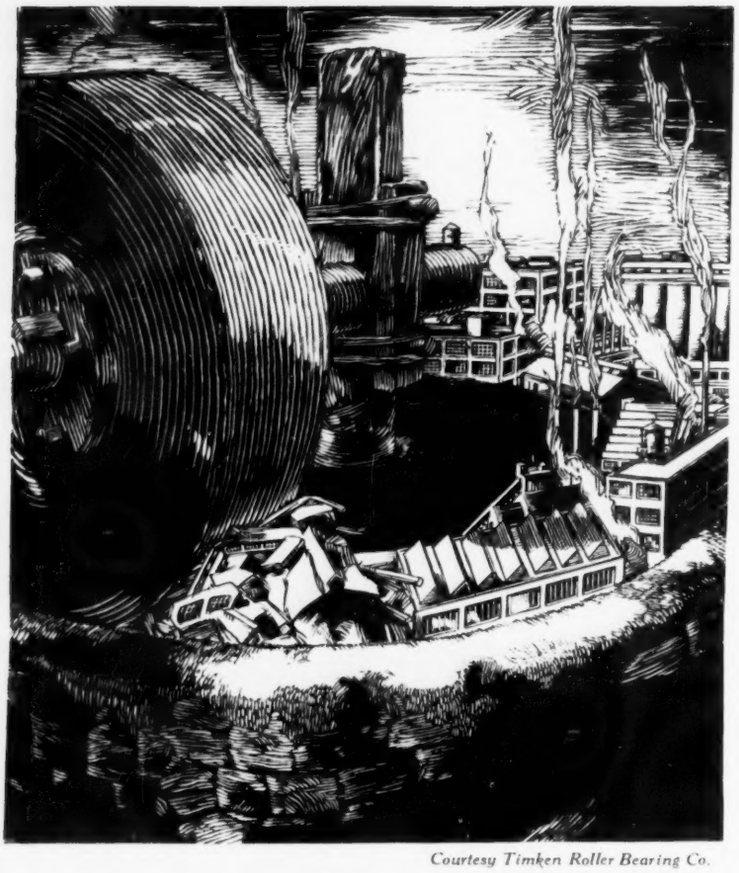

Courtesy Timken Roller Bearing Co.

What Will Wastes' Mill Grind Today?

Too often is industry lured by the slightly lower cost of quantity purchases. Too much is thought of first cost because differences are so obvious, while too little attention is given to the final cost which is more difficult to measure.

However, in the buying of steel, which requires expensive housing and handling equipment, which deteriorates quickly if not properly cared for and which wastes easily through changes in design, odd lengths, etc., it is usually cheaper to buy exactly what you want for the job at hand.

Check up on your inventory—check your scrap sales and this truth may become more apparent.

Bars	Sheets, Full Finished	Strip Steel	Forging Bars	Allegheny Metal
Structurals	Refined Iron	Boiler Tubes	Billets	Concrete Reinforcing
Rails	Turned, Ground and	and Fittings	Babbitt Metal	Firmtread Plates
Plates	Polished Shafting	Rivets and Bolts	Alloy Steel	Small Tools
Sheets, Blk. and Galv.	Screw Stock	Welding Rod	Tool Steel	Machinery, etc.

Write for the Ryerson Journal and Stock List—the "Key" to Immediate Steel.

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RYERSON
STEEL-SERVICE

Volume 90 Number 26

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

PRODUCTION may fade to 17 per cent, earnings barely cover fixed charges and the markets be devoid of anything tangible for the immediate future, yet a spirit of continuity as vital as the tradition of a deep-rooted colonial family quickens the iron and steel industry. In the week's news are two earnests of this unflagging confidence in the future: Expansion of the country's steel plant during the most disastrous year in a decade, and an unprecedented shakeup in personnel by the United States Steel Corp. in anticipation of more competitive times.

Excess Capacity Is Insurance for Future

Final statistics on the output of steel ingots give 1931 a total of 25,428,922 tons, 36 per cent below 1930 and smallest since 1921 (pp. 14, 15). In only four states was over a million tons of finished products rolled. But, on Dec. 31, steel ingot capacity at 68,298,596 tons was up 2 per cent. Gains in basic open-hearth and electric capacity more than offset a static condition at bessemer and declines at acid open-hearth and crucible plants. Due probably to inroads of scrap, pig iron and ferroalloy capacity eased.

Corp. Trains New Crew in Calm Waters

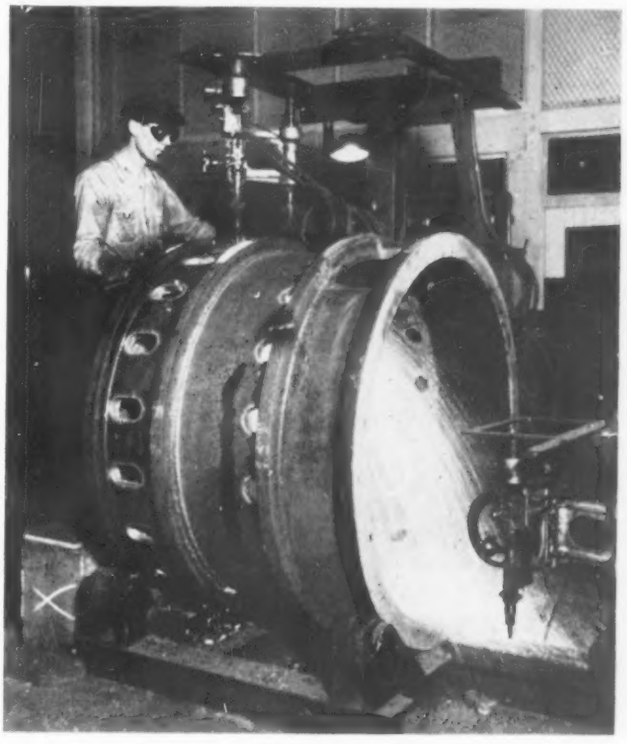
In drydock for practically the first time in 31 years, the Steel corporation is undergoing a thorough overhaul and shipping a generous sprinkling of new officers (p. 11). Thus far in 1932, presidents of the Corporation itself and three subsidiaries have been replaced, four vice presidents appointed, adjustments made in two district sales offices—and the end is not yet. When she plows again into good business, the good ship CORPORATION will have a bone in her teeth.

Drives Are Idle, but Perfect New Ones

Nor is there any disposition by the technical side of industry to "lay down." To iron and steel electrical engineers at their annual convention in Pittsburgh (p. 26) the fact that main roll drive sales last year were only 63, or half of the 1930 volume, and their horsepower only 119,325, lowest since 1923, was subordinate to the tendency toward higher horsepower rating and higher voltages on alternating-current drives. . . . At the accompanying exposition the latest mill equipment was exhibited (p. 27), particularly prominent being photoelectric control devices, antifriction bearings, lubrication systems and motors.

Taking Guesswork Out of the Foundry

A constructive, long-pull outlook also characterized the joint symposium of the American Foundrymen's association and the American Society for Testing Materials at the annual meeting of the latter at Atlantic City (p. 28). In the past, foundrymen were impelled to assume their ability to make castings regardless



Entirely automatic, yet accurate to the fraction of an inch is this cutting flame used at the East Pittsburgh, Pa., works of the Westinghouse Electric & Mfg. Co. on a large motor frame

of size and nature; today, their attitude is to endeavor to master a special product. . . . Various committees of the Testing society presented recommendations for revised specifications (p. 30), especially on ferroalloys and bessemer steel. Numerous changes in nomenclature were proposed; testing methods made more specific.

Lightness, Nonrusting, Open Home to Steel

A new silicon-bronze alloy containing tin, recently developed (p. 35), possesses in addition to the advantages of strength and corrosion resistance special properties which impart more desirable fabricating characteristics than are usually found in silicon bronzes. This alloy's strength is similar to that of low and medium carbon steel; its corrosion resistance is comparable to pure carbon. . . . Such alloys find increasing use in articles for the home, where lightness and resistance to corrosion are determining factors. A new steel household device (p. 35), is a two-wheeled rubber-tired cart for the sanitary handling of garbage, the steel parts being shipped knocked down.

At Least It Warns When It Fails

Four to six per cent chrome steel (p. 33) is winning favor for high-temperature service in the oil refining industry not only because it affords at least triple the life of carbon steel but also for the reason it bulges and gives warning of impending failure. The addition of tungsten or molybdenum to this steel improves it. . . . Prior to forging, rustless steel should be given a thorough preheating in a controlled furnace separate from the forging furnace, is the experience (p. 37) of a western forge interest. . . . A chrome steel containing vanadium and little carbon (p. 37) has been found to possess an unusual combination of properties for nitriding.

Carburize Commercially by Gas

Experiments in carburizing steel by means of gas have been carried on for years, some being adapted commercially. Only recently, however, has a continuous-type furnace for gas carburizing been developed and installed in several plants (p. 23). The furnace comprises a muffle chamber extending throughout its entire length, with purging chambers at either end to exclude air. Work is pushed through the furnace on alloy grids or trays; carburizing gas is introduced at the charge end; heat is supplied by gas burners firing above and under the muffle.

Scrap for Japan Booms Exports

Exports of iron and steel products from the United States in May show a gain of over 22,000 tons largely because the outward movement of scrap, chiefly to Japan (p. 13), soared to 45,000 tons. Receipts of pig iron put imports up in May. . . . Despite the new English tariff, Indian iron continues to undersell domestic iron in the Midlands (p. 57) but there is a slight offset in greater interest of Canadian buyers in Scottish steel.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

To the Editor:

Your editorial entitled, "Merit vs. Reciprocity in Buying and Selling," on page 18 of STEEL for June 13, prompts me to send you a copy of a paper which I presented on this topic at the recent convention of the public utility group of the National Association of Purchasing Agents in Birmingham, Ala.

With the conclusion of your editorial I am in agreement but I believe the assumption that to practice reciprocity higher prices must be paid or inferior quality accepted applies so rarely as to be quite exceptional, and even where it does apply there usually are extenuating circumstances that result in more profit than harm.

C. E. SMITH, Vice President
The New York, New Haven & Hartford Railroad Co.
New Haven, Conn.

Editor's Note—Mr. Smith's address deals with the importance of buyer and customer contact in the work of public relations for utilities companies. The following statements from it are pertinent to this discussion:

"I have found it possible to buy from our customers to the best interests of my company by proceeding in one, two, three order as follows:

"First consideration: Quality and service;

"Second consideration: The most reasonable price;

"Third consideration: Buy all we can from those who buy from us and who meet the first two considerations, quality and price.

"I have found that the practice of reciprocity in purchasing from our customers requires the exercise of much diplomacy, and properly conducted, it is not necessary to pass up competition nor to accept goods of inferior quality nor to pay higher prices."

To the Editor:

Congratulations on your effective rebuttal of the crepe-hanging comments of Alexander Hamilton institute on the steel situation! May I add that as a buyer of steel a 31 per cent reduction in present steel prices would discourage me from ever wanting to buy another pound. I hate to think what such a flop in steel prices would do to the market for our products which we have been doing our feeble best to stabilize.

As this institute says in its current advertising: "A vice presidency awaits the executive who can solve this problem." Here's the problem: If steel prices and other commodity prices, down now to a 1912 level, or close to it, should be reduced 31 per cent more to stimulate buying, how much should a man who wants to "forge ahead in business" pay for an Alexander Hamilton course? If my figures are correct, this course sold for $96 in 1912, for $132 in 1920 and is now selling for $225—all on the time payment basis. Will you please ask the institute to solve this one? I can't find the answer in any of the 24 text books I have.

PERPLEXED

Personnel Changes in Steel Corp. in 1932 Set Record

RETIREMENTS and appointments by the United States Steel Corp. thus far in 1932 constitute an overturn in personnel unparalleled in the American steel industry. Apparently, the Corporation is taking advantage of the present calm in production and sales to make adjustments preparatory to more competitive times.

Not only has the 70-year mandatory retirement program taken its inescapable toll, but the provision for voluntary retirement after 65 also has been invoked, thus forestalling adjustments that would have come due in the next year or so, in a period possibly more complicated than today.

Last week it was announced that Eugene J. Buffington, who will be 70 on March 14, 1933, will voluntarily relinquish the presidency of the Illinois Steel Co. July 1. Succeeding him will be George G. Thorp, now a vice president of the company.

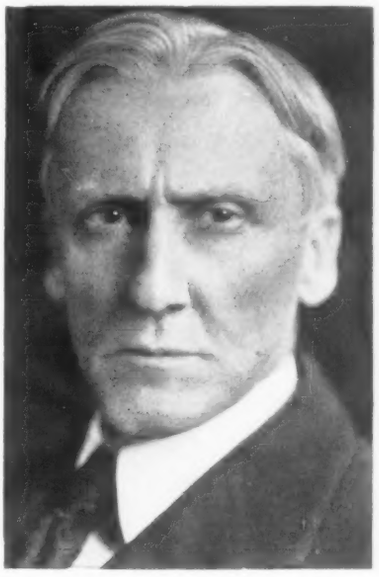
In view of the retirement June 7 of Theodore W. Robinson as a vice president of the Illinois company, the changes in the higher management of this subsidiary have been more marked than in any other.

Edwin S. Mills now is the ranking vice president of the Illinois company. The successor to Mr. Thorp as vice president is George C. Kimball, a vice president of the American Sheet & Tin Plate Co. Whether the third vice presidency will be filled has not been stated.

This week the Corporation will formally announce the retirement July 1 of Charles C. Cluff as district sales manager at New York for the Carnegie Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co.

Charles C. Cluff

Retiring district sales manager, New York, for Carnegie, Illinois and Tennessee companies



Eugene J. Buffington

Retiring president, Illinois Steel Co.

His successor at New York will be James R. Mills, now district sales manager at Cleveland for these subsidiaries. The vacancy at Cleveland will be filled by F. C. Hardie, now in the Chicago sales office of the Illinois company.

Some further changes in the personnel of the Corporation at New York are rumored.

James A. Farrell, president of the Corporation, touched off the series of retirements Jan. 12. Then, on Feb. 1, William J. Filbert became vice chairman of the finance committee; on March 9 William A. Irvin was elected to succeed Mr. Farrell as president on April 19; and on March 29 Myron C. Taylor assumed the chairmanship of the board—a post nominally vacant since the passing of Judge E. H. Gary in 1927.

The retirements of the Corporation since Jan. 1, including four presidents, may thus be summarized:

James A. Farrell, president, United States Steel Corp.; April 19.

John H. Hearding, assistant general manager, Oliver Mining Co.; April 3.

A. T. deForest, president, Columbia Steel Co.; June 1.

W. L. Hayes, manager of wire mills, Cleveland district, American Steel & Wire Co.; June 1.

Theodore W. Robinson, vice president, Illinois Steel Co.; June 7.

Eugene J. Buffington, president, Illinois Steel Co.; July 1.

Ward B. Perley, president, Canadian Steel Corp.; July 1.

Charles C. Cluff, district sales manager, Carnegie Steel Co.; July 1.

Appointments during this period include:

William J. Filbert, vice chairman of finance committee, United States Steel Corp.; Feb. 1.

H. L. Austin, comptroller, United States Steel Corp.; Feb. 1.

A. W. Vogt, senior assistant comptroller, United States Steel Corp.; Feb. 1.

Myron C. Taylor, chairman of finance committee, United States Steel Corp.; March 29.

William A. Irvin, president, United States Steel Corp.; April 19.

Charles S. Belsterling, vice president, United States Steel Corp.; May 1.

R. E. Zimmerman, assistant to president, United States Steel Corp.; May 1.

Ambrose N. Diehl, president, Columbia Steel Co.; June 1.

C. L. Wood, vice president, United States Steel Corp.; June 1.

C. V. McKaig, vice president, Carnegie Steel Co.; June 1.

George C. Kimball

New vice president, Illinois Steel Co.

George G. Thorp, president, Illinois Steel Co.; July 1.

J. W. Seens, president, Canadian Steel Corp. as well as Canadian Bridge Co.; July 1.

George C. Kimball, vice president, Illinois Steel Co.; July 1.

J. R. Mills, district sales manager, New York, Carnegie Steel Co.; July 1.

F. C. Hardie, district sales manager, Cleveland, Carnegie Steel Co.; July 1.

Mr. Buffington is completing 34 years of service as head of the Illinois company. A graduate of Vanderbilt university, Nashville, Tenn., of which for many years he has been a trustee, he became identified with the iron and steel industry in 1884 as director and treasurer of the American Wire Nail Co., Covington, Ky.

This company later constructed a wire and nail plant at Anderson, Ind., and when the American Steel & Wire Co. of Illinois acquired this plant in 1898, Mr. Buffington continued as director, member of the executive committee and treasurer. In January, 1899, he succeeded John W. Gates as president of the Illinois company.

In addition to being president or director of a number of Corporation subsidiaries, Mr. Buffington is a director of the Corporation itself, a post he will continue. He also is a director of the American Iron and Steel institute and of the Continental-Illinois Bank & Trust Co., Chicago.

Builder of Gary

Mr. Thorp, new president of the Illinois company, is a graduate of the University of Wisconsin. Successively he was with the Joliet works of the Illinois company, Colorado Fuel & Iron Co., again the Illinois company, then general superintendent of the Clairton works of the Carnegie Company, going to Illinois as vice president in 1905. He had charge of the design and construction of the Gary works of that company.

Mr. Kimball, new vice president of the Illinois company, is a 1900 graduate of Harvard. In 1901 he entered the engineering department of the American Tin Plate Co. at Pittsburgh, in 1905 became chief engineer of the American Sheet & Tin Plate Co., and in 1931 was made a vice president.

Mr. Cluff, who retires July 1 as New York district sales manager of the Carnegie, Illinois and Tennessee companies, terminates an affiliation of approximately 48 years with the steel industry. All this time was spent in New York and with companies which now comprise the United States Steel Corp.

Mr. Cluff's first connection was as entry clerk for the Iowa Barb Wire Co., which later was merged into the Consolidated Steel & Wire Co., which in turn became absorbed by the American Steel & Wire Co. From 1895 to 1901 he was general eastern sales agent fo the Illinois Steel Co.

Upon formation of the United States Steel Corp. in 1901, he became assistant manager of sales at New York for the Carnegie and Illinois companies and later for Tennessee. On Sept. 1, 1910, he became district manager of sales for these companies, the position from which he is now retiring.

Mr. Cluff will maintain offices at 165 Broadway, New York, after July 1.

The Business Week In Washington

SENATE has passed the Costigan resolution calling upon the tariff commission to make an investigation of the differences of the cost of production of domestic and foreign "cast iron pipe of every description, and cast iron fittings for cast iron pipe, dutiable under the provisions of paragraph 327 of the Tariff act."

□ □ □

House ways and means committee will make a study this summer of conflicting state and federal taxes during the congressional recess.

□ □ □

During the past two years, announces the tariff commission, changes have been made in the rate of 31 commodities.

□ □ □

A German government decree, effective June 25, reduces export duties on used machinery from 15 to 80 reichsmarks per 100 kilos to rates ranging from 7 to 25 reichsmarks, according to a cablegram to the department of commerce.

□ □ □

President Hoover has approved the report of the tariff commission, under the flexible provisions of the present law, that the duty of 5 cents a pound on alsimin, ferrosilicon aluminum, and ferroaluminum silicon, containing 20 to 50 per cent aluminum, be halved.

□ □ □

Simplified practice recommendation for shovels, spades and scoops has been extended one year without change.

□ □ □

May operations in manufacturing establishments showed a decline from April, according to the United States employment service. A marked reduction was noted in the iron, steel and automobile industries.

Barges Shapes to Beaumont

Pittsburgh—Carnegie Steel Co., Pittsburgh, has completed a shipment of steel products entirely by an all-water route to Beaumont, Tex. The cargo was consigned by barge to New Orleans and then loaded on barges of the Louisiana-Texas Waterways Corp. through the intracoastal canal. The shipment consisted of about 200 tons of structural material.

Bar Mill Wage Scale Is Reaffirmed for Year

Pittsburgh—The basic wage scale in effect in bar mills for the year 1931-1932 has been reaffirmed for the ensuing year, beginning June 30, by the Western Bar Iron association and the Amalgamated Association of Iron, Steel and Tin Workers. The scale has been unchanged for the past five years. Under this scale puddlers have been receiving $10.05 per ton in May and June. The rate for July and August will not be determined until the latter part of June, when average sales prices for May and June will be determined.

Conferences now are in progress respecting the sheet and tin plate mill scale, and a satisfactory decision is expected shortly.

Propose Reduced Rates on Cold-Rolled Strip

Worcester, Mass. — Reduction of freight rates on cold-rolled bands and strip, minimum weight 42,000 pounds, from Darlington, R. I., to Springfield, Mass., and Waterbury, Conn., is docketed by the New England Freight association. The present rate to both points is 12½ cents, the proposed rate being 9 cents to Springfield and 9½ cents to Waterbury. This proposed rate, however, applies only on cold-rolled strip steel made from material received at Darlington via the New Haven railroad, providing the material has not been held at Darlington more than 12 months. This proposed rate is made to place shippers at Darlington on a comparable basis with those at Mansfield.

Liquidator Is Named for Algoma Steel Corp.

Toronto, Ont.—An adjustment of the financial difficulties of the Algoma Steel Corp. and the Lake Superior Corp., Sault Ste. Marie, Ont., has been complicated by a court decision June 22, declaring the Algoma corporation insolvent and naming the Chartered Trust & Executor Co., liquidator.

Previously, under a friendly receivership action, William C. Franz, president of the Corporation; Alexander Taylor, vice president; and Sir William E. Stavert, a director, were

named receivers to continue the business.

The insolvency action followed application of the Cannelton Coal & Coke Co., a West Virginia firm, with a claim for $62,476, for coal supplied in 1931.

According to Mr. Franz, unless some reorganization is effected, unsecured creditors may receive nothing.

Continue Locomotive Co.

Toronto, Ont.—National Trust Co. Ltd., as trustee for bondholders of the Canadian Locomotive Co., Kingston, Ont., which will probably default its July interest, is recommending operations be conducted on a small scale in preference to foreclosure or receivership.

Exports Shrink in Same Ratio as Production

In spite of a drastic shrinkage in volume, American foreign trade still represents about 10 per cent of the total. The National Foreign Trade council reports that the reduction in exports from 1929 to the beginning of 1932, calculated in volume and allowing for reduction in prices, was about 35 per cent. During the same period manufacturing, mining and agricultural production in the United States decreased 46 per cent. But allowing for reduction in prices the actual decrease in volume was less than 36 per cent. Therefore exports bear the same proportion to total manufactures as before the depression.

Scrap Puts May Exports Up Sharply; Imports Rise Mildly

EXPORTS of scrap—principally to Japan—lifted exports of iron and steel products from the United States in May to 80,477 gross tons, largest since July, 1931.

Shipments of scrap, at 45,000 tons, showed an increase of 25,953 tons over the 19,047 tons moved out in April. For the month as a whole, exports were up only 22,359 tons, indicating a slight recession in other products.

Imports of iron and steel products in May at 39,751 gross tons increased slightly over the 36,339 tons of April, according to the iron and steel division, department of commerce, Washington.

Thus in five months of 1932, imports have totaled 174,912 tons, compared with 195,123 tons in 1931. Exports in five months of 1932 stand at 269,674 tons, against 489,684 tons in 1931.

In addition to the sharp rise in scrap in May, exports of skelp, black sheets, shapes and line pipe increased moderately. Declines developed in tin plate and terne plate, galvanized sheets, boiler plates, steel bars, rails, and most wire products.

The import total in May was given a slight spurt due to heavier receipts of pig iron, these being 16,819 tons in May, compared with 9848 tons in April. Concrete bar arrivals also practically doubled, being 4508 tons in May, compared with 2650 tons in April. Slight declines developed in imports of merchant steel bars, skelp, structural shapes and barbed wire.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1932		1931	
	Imports	Exports	Imports	Exports
Jan.	31,053	40,660	41,628	92,719
Feb.	26,738	40,492	28,045	91,161
March	41,031	49,927	40,402	109,324
April	36,339	58,118	47,872	101,434
May	39,751	80,477	37,176	95,046
(5 mo.)	174,912	269,674	195,123	489,684
June	.....	.....	37,819	75,577
July	.....	.....	37,190	84,465
Aug.	.....	.....	30,139	73,338
Sept.	.....	.....	30,966	69,778
Oct.	.....	.....	29,401	59,335
Nov.	.....	.....	34,658	59,556
Dec.	.....	.....	25,812	57,263
Total	.....	.....	421,108	968,996

IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Item	May 1932	April 1932	May 1931
Pig iron	16,819	9,848	10,057
Sponge iron	....	....	....
Ferromanganese, spiegel (1)	3,047	2,510	1,708
Ferrochrome (2)	22	49	15
Ferrosilicon (3)	12	....	65
Other ferroalloys	100	289	....
Scrap	1,950	532	1,497
Ingots, blooms, billets, etc.	34	88	1,582
Concrete bars, etc.	4,508	2,650	3,554
Hollow bar, drill steel	54	78	149
Merchant steel bars	2,076	3,331	2,371
Iron slabs	....	....	19
Iron bars	22	76	33
Wire rods	388	276	669
Boiler and other plate	9	51	3
Sheets, skelp, sawplate	1,975	2,820	2,296
Tin plate	392	4,151	4
Structural shapes	2,905	3,154	6,221
Sheet piling	....	....	123
Rails and fastenings	513	685	214
Cast iron pipe, fittings	....	12	1,696
Welded pipe	252	578	809
Other pipe	382	200	343
Barbed wire	909	1,390	606
Round iron and steel wire	183	223	258
Telephone, telegraph wire	5	....	....
Flat wire, strip steel	85	84	48
Wire rope, strand	217	202	160
Other wire	69	112	16
Hoops and bands	1,989	1,889	1,393
Nails, tacks, staples	751	995	750
Bolts, nuts, rivets	10	11	72
Horse and mule shoes	1	2	180
Castings and forgings	72	53	268
Total	39,751	36,339	37,176

(1) Manganese content. (2) Chromium content. (3) Silicon content.

ORIGIN OF MAY IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
British India	....	4,019	....	....
Canada	430	....	....	1,631
Chile	43,304	....	....	....
Soviet Russia	15,900	....	2,470	....
United King.	....	5,718	....	332
Yugoslavia	....	....	....	393
Algeria, Tunis	3,625	....	....	....
Netherlands	....	7,077	....	....
France	....	....	....	21
Germany	....	....	....	119
Italy	....	....	....	21
Norway	16,845	....	....	530
Other Countries	....	5	9	....
Total	80,104	16,819	2,479	3,047
		Steel ingots	Steel scrap	Steel bars
Belgium	....	11	....	1,099
Norway	....	2	....	4
Sweden	....	7	20	155
Canada	....	3	1,871	1
United King.	....	11	....	17
Cuba	....	....	37	....
Dominican Rep.	....	....	20	....
Jamaica	....	....	2	....
France	....	....	....	309
Germany	....	....	....	442
Mexico	....	....	....	36
Czechoslovakia	....	....	....	5
Other Countries	....	....	....	8
Total	....	34	1,950	2,076

EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Item	May, 1932	April, 1932	May, 1931
Pig iron	191	221	812
Ferromanganese, spiegel	....	8	1
Scrap	45,000	19,047	13,231
Ingots, blooms, billets, slabs and sheet bars	690	107	240
Iron bars	84	43	104
Steel bars	1,227	1,846	3,282
Alloy steel bars	161	76	317
Wire rods	1,048	1,178	4,532
Boiler, other plates	812	1,653	5,338
Skelp	4,200	954	5,752
Iron sheets, galvanized	98	141	426
Steel sheets, galvanized	2,194	2,425	6,071
Steel sheets, black	5,091	4,534	8,703
Iron sheets, black	296	501	743
Hoops, bands, strip	2,208	1,743	3,066
Tin, terne plate	2,212	4,460	6,129
Water, oil, gas and other tanks, except lined, etc.	72	246	688
Shapes, not fabricated	1,285	1,728	7,548
Shapes, plates, fabricated	1,032	859	3,284
Metal lath	114	90	228
Frames, sashes, piling	388	533	234
Rails	1,171	1,216	3,190
Rail fastenings	256	197	574
Boiler tubes	115	198	581
Casing and oil-line pipe	2,049	685	4,161
Seamless black pipe, other than casing (1)	27	79	....
Malleable - iron screwed pipe fittings	245	139	468
Cast - iron screwed pipe fittings	60	64	142
Cast - iron pressure pipe and fittings	113	2,188	1,602
Cast - iron soil pipe and fittings	267	758	576
Welded black and galv. steel pipe	2,506	2,938	4,055
Welded black and galv. wrought-iron pipe	449	1,064	554
Riveted pipe, fittings (1)	32	20	....
Plain black or galvanized iron or steel wire	696	1,117	1,181
Barbed wire, woven fencing	1,732	2,293	3,028
Woven-wire screen cloth	67	68	86
Wire rope	135	141	254
Insulated wire and cable	3	58	18
Other wire and mfg.	165	160	345
Wire nails	496	781	585
Tacks	44	32	35
Other nails, staples	272	355	288
Bolts, machine screws, nuts, rivets, and washers	205	224	495
Iron castings	242	235	308
Steel castings	151	111	260
Car wheels and axles	285	306	620
Horseshoes	1	1	22
Forgings	290	297	889
Total	80,477	58,118	95,046

(1) Not shown prior to 1932.

1931 Steel Ingot and Casting Output

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years	Open-hearth			Bessemer	Crucible	Electric	Miscellaneous	Total Gross tons
	Basic	Acid	Total					
1917	32,087,507	2,061,386	34,148,893	10,479,960	126,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535	42,132,934
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	...	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	...	44,943,696
1924	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	...	37,931,939
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	...	45,393,524
1926	39,663,315	1,038,664	40,691,979	6,934,568	15,491	651,723	...	48,293,763
1927	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	...	44,935,185
1928	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	...	51,544,180
1929	47,232,419	1,120,469	48,352,888	7,122,509	6,645	951,431	...	56,433,473
1930	31,268,316	780,856	32,049,172	5,035,459	2,253	612,599	...	40,699,483
1931	22,130,398	379,168	22,509,566	3,023,446	1,547	410,942	...	25,945,501

PRODUCTION OF STEEL CASTINGS.

1917	558,508	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,339	108,296	110	1,411,410
1919	313,965	448,555	762,520	98,819	1,009	111,510	2,579	976,437
1920	449,339	537,070	986,409	104,980	1,729	155,196	3,237	1,251,542
1921	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922	425,981	404,767	830,748	47,733	1,045	154,982	...	1,034,508
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	...	1,458,031
1924	456,518	402,901	859,419	53,437	1,377	206,549	...	1,120,782
1925	455,282	462,303	917,585	53,841	1,833	279,534	...	1,252,786
1926	480,627	505,379	986,006	43,066	2,041	326,445	...	1,357,558
1927	393,881	430,414	824,295	38,024	1,340	294,809	...	1,158,468
1928	381,926	458,590	840,516	28,450	1,253	348,568	...	1,218,787
1929	588,213	544,076	1,132,289	30,829	883	419,039	...	1,583,040
1930	309,798	413,675	783,473	14,871	690	305,181	...	1,104,215
1931	143,465	184,780	328,245	12,052	716	175,566	...	516,579

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS.

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1918	1,721,367	66,485	1,787,852	1925	2,320,390	112,581	2,432,971
1919	1,435,816	45,372	1,481,188	1926	2,317,313	116,101	2,463,414
1920	1,591,939	68,353	1,660,292	1927	2,385,901	145,844	2,531,748
1921	769,291	40,255	809,548	1928	3,045,225	169,684	3,214,909
1922	1,614,392	59,104	1,673,496	1929	3,764,287	192,920	3,957,207
1923	2,014,269	92,220	2,106,489	1930	2,317,183	126,128	2,443,311
1924	1,940,461	85,948	2,026,409	1931	1,366,010	89,901	1,455,913

Similar statistics are not available prior to 1909.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1930-1931.

Processes.	1931—Gross tons			Total, 1930
	Ingots	Castings	Total	
Open-hearth steel—basic	1,127,033	4,458	1,131,491	2,089,971
Open-hearth steel—acid	23,471	34,395	57,866	81,581
Bessemer steel	29,170	4,874	34,044	50,655
Crucible steel	309	92	401	581
Electric steel	186,027	46,080	232,113	300,520
Total Gross tons	1,366,010	89,903	1,455,913	2,443,311

In 1931, there were 201 works in 30 States, the District of Columbia and Alaska which made alloy steel ingots or castings.

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, GROSS TONS, 1891-1931.

Years	Iron and steel rails	Plates and sheets	Wire rods	Structural shapes	Nail plate	All other finished rolled	Total Gross tons
1891	1,307,176	678,927	536,607	.....	223,312	2,644,941	5,390,963
1892	1,551,844	751,460	627,829	453,957	201,242	2,579,482	6,165,814
1893	1,136,458	674,345	537,272	387,397	136,113	2,104,190	4,975,685
1894	1,021,772	682,900	673,402	360,305	108,262	1,795,570	4,642,211
1895	1,306,135	991,459	791,130	517,920	95,085	2,487,845	6,189,574
1896	1,122,010	965,776	623,986	495,571	72,137	2,236,361	5,515,841
1897	1,647,892	1,207,286	970,730	583,790	94,054	2,497,970	7,001,728
1898	1,981,241	1,448,301	1,071,083	702,197	70,188	3,239,760	8,513,370
1899	2,272,700	1,903,505	1,036,398	850,376	85,015	4,146,425	10,294,419
1900	2,385,682	1,794,528	846,291	815,161	70,245	3,575,536	9,487,443
1901	2,874,639	2,254,425	1,365,934	1,013,150	68,850	4,772,329	12,349,327
1902	2,947,933	2,665,409	1,574,293	1,300,326	72,936	5,383,219	13,944,116
1903	2,992,477	2,599,665	1,503,455	1,095,813	64,102	4,952,185	13,207,697
1904	2,284,711	2,421,398	1,099,028	949,146	61,601	4,597,497	12,013,381
1905	3,375,929	3,532,230	1,808,688	1,660,519	64,542	6,398,107	16,840,015
1906	3,977,887	4,182,156	1,871,614	2,118,772	54,211	7,383,828	19,588,468
1907	3,633,654	4,248,832	2,017,583	1,940,352	52,027	7,972,374	19,864,822
1908	1,921,015	2,649,693	1,816,949	1,083,181	45,747	4,311,608	11,828,193
1909	3,023,845	4,234,346	2,335,685	2,275,562	63,746	7,711,506	19,644,690
1910	3,636,031	4,955,481	2,241,830	2,266,890	45,294	8,475,750	21,621,279
1911	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,999	19,039,171
1912	3,327,915	5,875,080	2,653,552	2,846,487	45,331	9,908,475	24,656,841
1913	3,502,780	5,751,037	2,464,807	3,004,972	37,503	10,030,144	24,791,243
1914	1,945,095	4,719,246	2,431,714	2,031,124	38,573	7,204,444	18,370,196
1915	2,204,203	6,077,694	3,095,907	2,437,003	31,929	10,546,188	24,392,924
1916	2,854,518	7,453,980	3,518,746	3,029,904	30,088	15,493,093	32,380,389
1917	2,944,161	8,267,616	3,137,138	3,110,000	22,864	15,585,921	33,067,700
1918	2,340,892	8,799,135	2,562,390	2,849,969	18,310	14,385,058	31,155,754
1919	2,203,843	7,372,814	2,538,476	2,614,036	12,832	10,359,543	25,101,544
1920	2,604,116	9,337,680	3,136,907	3,306,748	20,577	13,941,855	32,347,863
1921	2,178,818	4,260,574	1,564,330	1,272,624	14,573	5,483,087	14,774,006
1922	2,171,776	7,968,397	2,654,741	2,718,768	21,969	10,916,353	26,452,004
1923	2,904,516	9,497,717	3,075,892	3,405,197	22,833	14,370,921	33,277,076
1924	2,433,332	8,087,883	2,522,545	3,283,708	22,175	11,736,792	28,086,435
1925	2,785,257	9,807,659	2,844,656	3,604,130	22,038	14,323,220	33,186,960
1926	3,217,649	10,529,056	2,722,032	3,911,663	17,337	15,098,155	35,495,892
1927	2,806,486	9,627,734	2,770,271	3,742,445	18,051	13,914,044	32,879,031
1928	2,647,493	11,006,050	3,080,816	4,096,143	16,200	16,816,214	37,662,916
1929	2,722,138	12,436,312	3,134,409	4,778,020	9,827	17,988,710	41,069,416
1930	1,873,233	9,067,366	2,348,600	3,512,473	*	12,711,535	29,513,607
1931	1,157,751	6,039,581	1,844,620	2,062,858	*	8,071,084	19,175,894

*Included in "all other finished rolled."

Prior to 1887 complete statistics of the production of all forms of finished rolled iron and steel are not available.

Official Statistics of American Iron and Steel Institute Mirror Drop of 36.2 Per Cent—Annual Survey of Capacity Shows Pig Iron Loss

STEEL ingots and castings produced in the United States during 1931, according to figures compiled by the American Iron and Steel institute, totaled about 60 per cent of the total for 1930 and about 45 per cent of the record production of 1929. Total steel ingots and castings turned out in 1931 were 25,945,501 gross tons, compared with 40,699,483 tons in 1930 and 56,433,473 tons in 1929. The rate of decline was more rapid in 1931, at 36.2 per cent from 1930, compared with 27.8 per cent in 1930 from 1929.

Separating steel ingots and castings, the figures show a relatively heavier loss in the latter. Total ingots in 1931 were 5,428,922 tons, compared with 39,595,268 tons, a loss of 35.5 per cent, while castings dropped from 1,104,215 tons in 1930 to 516,579 tons in 1931, a loss of 53.3 per cent.

Included in the 22,130,398 tons of basic open-hearth steel ingots and castings produced in 1931 are 945,844 tons of duplex steel ingots and castings, which were made from metal partly purified in bessemer converters and finally purified in basic open-hearth steel furnaces, compared with 2,045,277 tons in 1930, a decrease of 1,099,433 tons, or 53.75 per cent.

Finished rolled iron and steel in 1931 totaled 19,175,894 gross tons, compared with 29,513,007 tons in 1930 and 41,069,416 tons in the record year, 1929, a loss of 35 per cent from 1930, compared with a decline of 39.1 per cent from 1929 to 1930. Of finished rolled production in 1931, iron accounted for 188,726 tons and steel for 18,987,168 tons. This is the smallest iron production reported by the Institute and continues the steady decline in rolled iron.

Of the total production in 1931, about 99.02 per cent was rolled from steel, compared with 98.93 per cent in 1930, and 0.98 per cent was rolled iron. In 1931 about 33.08 per cent was rolled in Pennsylvania, against 35.64 per cent in 1930; and about 21.31 per cent in Ohio against 20.57 per cent in 1930. In 1931 there were 287 plants in 27 states which rolled finished forms of steel or iron, against 308 plants in 27 states in 1930.

The American Iron and Steel institute annual survey of capacities for pig iron, ferroalloys and steel ingots has been completed for 1931 and shows the following results: Annual capacity for pig iron production as of Dec. 31, 1931, was 50,937,775 gross tons, compared with 51,850,775 tons as of Dec. 31, 1930; ferroalloys, covering blast furnaces only, for 1931 it was 802,400, compared with 809,100 for 1930; total pig iron and ferroalloy capacity decreased from 52,659,875 tons Dec. 31, 1930, to 51,740,175 tons at the end of 1931; total capacity for steel ingots for 1931 was 68,298,956 tons, compared with 66,897,096 tons for Dec. 31, 1930. Basic open-hearth ingot capacity increased from 57,071,880 tons to 58,505,640 tons; acid open-hearth decreased from 927,690 tons to 897,990 tons; bessemer capacity remained unchanged at 8,070,000 tons; electric steel capacity increased from 801,940 tons to 805,240 tons; crucible steel capacity dropped from 25,586 tons to 20,086 tons.

Steel castings capacity is reported as follows: Total at close of 1931 was 2,041,145 gross tons and at end of 1930 it was 2,083,085 tons; basic open-hearth for 1931 was 789,700 tons compared with 811,310 tons for 1930; acid open-hearth for 1931 was 678,190, for 1930 it was 691,290 tons; bessemer, 30,375 tons and 37,875 tons; electric, 540,940 tons and 540,615 tons; crucible, 1940 tons and 1995 tons.

Far Below Figures of Preceding Years

PRODUCTION OF MERCHANT BARS, SHOWING IRON AND STEEL MERCHANT BARS SEPARATELY, GROSS TONS, 1912–1931.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1912	944,790	2,752,324	3,697,114	1922	317,665	3,660,993	3,978,658
1913	1,026,632	2,930,977	3,957,609	1923	404,730	5,148,066	5,552,796
1914	563,171	1,960,460	2,523,631	1924	258,737	4,022,184	4,280,921
1915	657,107	3,474,135	4,131,242	1925	290,488	5,368,827	5,659,315
1916	993,948	5,236,354	6,230,302	1926	252,437	5,221,399	5,473,836
1917	983,926	5,226,031	6,209,957	1927	187,995	4,682,252	4,870,247
1918	846,898	5,395,851	6,242,749	1928	165,277	6,112,558	6,277,835
1919	446,549	3,945,075	4,391,624	1929	154,690	6,316,456	6,471,146
1920	663,032	5,467,208	6,130,240	1930	95,234	4,043,130	4,138,364
1921	198,324	1,367,430	1,565,754	1931	52,943	2,391,452	2,444,395

PRODUCTION OF CONCRETE BARS, SHOWING IRON AND STEEL CONCRETE BARS SEPARATELY, GROSS TONS, 1916–1931.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1916	2,683	458,717	461,400	1924	507	655,615	656,122
1917	1,497	469,687	471,184	1925	1,195	818,392	819,587
1918	468	344,152	344,620	1926	1,649	814,180	815,829
1919	2,295	416,726	419,021	1927	2,428	813,585	816,013
1920	698	571,747	572,445	1928	462	951,426	951,888
1921	1,094	226,134	227,228	1929	557	951,793	952,350
1922	696	575,120	575,816	1930	160	849,991	*850,151
1923	368	680,499	680,867	1931	101	643,529	*644,631

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES, GROSS TONS, 1920–1931.

Years.	Heavy shapes.	Light shapes.	Total.	Years.	Heavy shapes.	Light shapes.	Total.
1920	2,741,120	565,628	3,306,748	1926	3,330,572	581,091	3,911,663
1921	1,082,727	189,807	1,272,624	1927	3,083,211	659,234	3,742,445
1922	2,337,026	381,742	2,718,768	1928	3,408,545	687,598	4,096,143
1923	2,917,446	487,751	3,405,197	1929	4,055,615	722,405	4,778,020
1924	2,805,084	478,624	3,283,708	1930	3,010,847	501,626	3,512,473
1925	3,049,817	554,313	3,604,130	1931	1,768,374	294,484	2,062,858

PRODUCTION OF SKELP SHOWING IRON AND STEEL SKELP SEPARATELY, GROSS TONS, 1916–1931.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1916	355,445	2,572,229	2,927,674	1924	165,581	3,004,962	3,170,543
1917	336,591	2,337,649	2,674,231	1925	178,586	3,051,182	3,229,768
1918	258,500	2,305,511	2,564,011	1926	189,774	3,574,776	3,764,550
1919	192,146	2,363,632	2,555,778	1927	156,204	3,262,648	3,418,852
1920	252,403	2,967,886	3,220,289	1928	140,318	3,228,655	3,368,973
1921	115,523	1,815,052	1,930,575	1929	151,556	3,365,682	3,517,238
1922	218,868	2,653,347	2,872,215	1930	114,426	2,567,620	2,682,046
1923	216,846	3,517,490	3,734,336	1931	70,777	1,428,503	1,499,280

PRODUCTION OF SEAMLESS STEEL TUBES, GROSS TONS, 1926–1931.

Years.	Hot finished.	Cold drawn.	Total.	Years.	Hot finished.	Cold drawn.	Total.
1926	620,936	154,393	775,329	1929	1,097,459	206,026	1,303,485
1927	725,970	138,170	864,140	1930	1,090,175	103,542	1,193,717
1928	906,032	172,895	1,078,927	1931	655,914	61,494	717,408

PRODUCTION OF TINPLATES AND TERNE PLATES, 1906–1931.

Years.	Tinplates.	Terne plates.	Total pounds.
1906	1,100,373,000	193,367,000	1,293,740,000
1907	996,650,000	156,447,000	1,153,097,000
1908	1,048,896,000	154,179,000	1,203,075,000
1909	1,179,858,000	190,930,000	1,370,788,000
1910	1,450,821,000	168,184,000	1,619,005,000
1911	1,597,629,000	158,441,000	1,756,070,000
1912	1,965,659,000	191,396,000	2,157,055,000
1913	1,708,186,000	136,944,000	1,845,130,000
1914	1,939,785,000	146,195,000	2,085,980,000
1915	2,201,825,054	163,470,646	2,365,295,700
1916	2,552,224,275	214,176,952	2,766,401,227
1917	3,233,314,911	153,891,653	3,387,206,564
1918	3,216,247,675	85,376,569	3,301,624,244
1919	2,407,156,757	171,859,924	2,579,016,681
1920	3,079,953,351	158,067,437	3,238,020,788
1921	1,675,320,852	103,853,961	1,779,174,813
1922	2,707,648,715	177,235,512	2,884,884,227
1923	3,168,263,546	*207,106,248	3,375,369,794
1924	2,975,231,674	*202,553,793	3,177,785,467
1925	3,458,574,585	*254,885,172	3,713,459,757
1926	3,750,481,879	*241,883,727	3,992,365,606
1927	3,546,778,888	*235,347,756	3,782,126,644
1928	3,841,576,534	*278,241,691	4,119,818,225
1929	4,008,338,817	*340,608,132	4,408,946,949
1930	3,719,128,284	*230,983,261	3,950,111,545
1931	3,118,589,245	*149,444,185	3,268,033,430

* Includes 114,544,486 pounds of long terne plates in 1931, 184,873,512 pounds in 1930, 253,604,576 pounds in 1929, 203,027,669 pounds in 1928, 152,371,645 pounds in 1927, 152,437,892 pounds in 1926, 163,820,675 pounds in 1925, 107,986,974 pounds in 1924, and 106,764,720 pounds in 1923.

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, 1930–1931.

Kinds of pipe	1930—Net tons.			1931—Net tons.		
	Pipe.	Fittings.	Total.	Pipe.	Fittings.	Total.
Gas and water*	1,138,862	47,177	1,186,039	910,242	35,094	945,336
Soil and plumbers	188,040	61,857	249,897	140,916	43,040	183,956
Total	1,326,902	109,034	1,435,936	1,051,158	78,134	1,129,292

* Includes culvert pipe.

PRODUCTION OF IRON AND STEEL GALVANIZED SHEETS AND GALVANIZED FORMED PRODUCTS, 1921–1931.

Years.	Galvanized sheets.	Galvanized formed products.*	Total Pounds.
1921	1,366,883,503	109,956,328	1,476,839,831
1922	2,109,991,396	165,713,067	2,275,704,463
1923	2,364,862,856	165,741,098	2,530,603,954
1924	2,228,960,835	155,901,514	2,384,862,349
1925	2,539,112,552	178,219,576	2,717,332,128
1926	2,788,473,075	154,572,764	2,943,045,839
1927	2,767,615,399	168,500,859	2,936,116,258
1928	3,040,763,695	172,453,640	3,213,217,335
1929	3,083,975,953	177,727,692	3,261,703,645
1930	†2,341,361,607	146,094,351	†2,487,455,958
1931	1,707,015,552	112,459,141	1,819,474,693

* Articles formed or stamped from iron or steel black plates or black sheets and galvanized after the completion of the forming or stamping process. † Revised.

PRODUCTION OF PLATES AND SHEETS BY KINDS, 1916–1931.

Years. Gross tons.	Universal plates.* Gross tons.	Sheared plates. Gross tons.	Total universal and sheared plates. Gross tons.	Black sheets rolled on sheet or jobbing mills. Gross tons.	Black plates rolled on tin mills.—Gross tons.		Total black sheets and black plates. Gross tons.
					Black plates for tinning.	Other black plate specialties.	
1916	1,224,234	2,453,150	3,677,384	2,249,597	1,274,137	252,862	3,776,596
1917	1,195,199	2,963,039	4,158,238	2,367,752	1,505,338	236,288	4,109,378
1918	1,234,782	3,885,126	5,119,908	2,073,639	1,489,586	116,002	3,679,227
1919	992,054	2,899,267	3,891,321	2,099,840	1,144,601	237,052	3,481,493
1920	1,249,709	3,505,364	4,755,133	2,886,401	1,449,330	246,816	4,582,547
1921	570,610	1,189,714	1,760,324	1,511,817	786,962	201,471	2,500,250
1922	1,248,413	2,171,507	3,419,920	2,947,236	1,266,652	364,589	4,548,477
1923	1,304,227	2,864,518	4,168,745	3,503,071	1,498,830	327,071	5,328,972
1924	1,001,694	2,147,171	3,148,865	3,266,430	1,415,182	257,406	4,939,018
1925	1,196,021	2,557,430	3,753,451	4,096,832	1,632,236	325,140	6,054,208
1926	1,407,547	2,793,635	4,201,182	4,237,479	1,761,944	328,451	6,327,874
1927	1,244,549	2,476,261	3,720,810	3,979,037	1,657,215	270,672	5,906,924
1928	1,304,356	2,609,272	3,913,628	4,962,410	1,791,021	338,991	7,092,422
1929	1,425,300	3,596,841	5,022,141	5,254,998	1,698,640	460,533	7,414,171
1930	1,040,715	2,622,108	3,662,823	3,511,557	1,691,938	201,048	5,404,543
1931	614,837	1,351,375	1,966,212	2,538,014	1,431,293	104,062	4,073,369

* Include flats and bars over 6 inches wide.

PRODUCTION OF WROUGHT PIPE AND SEAMLESS STEEL TUBES, INCLUDING BOILER TUBES, GROSS TONS, IN 1931.

Kinds of pipe or tubes.	*Lap weld and butt weld pipe or tubes—Gross tons.			Seamless pipe or tubes—Gross tons.		
	Iron.	Steel.	Total welded.	†Hot finished.	Cold drawn.	Total seamless.
Black, standard	27,625	518,346	545,971	7,038	533	7,571
Galvanized	21,211	258,790	280,001	1,817		1,817
Oil country goods	4,062	224,531	228,593	566,198	2,632	568,830
Mechanical tubes				17,777	31,064	48,841
O. D. & miscellaneous	104	49,468	49,572	3,016	13,163	16,179
Boiler tubes	4,372	12,852	17,224	60,068	14,102	74,170
Total	57,374	1,063,987	1,121,361	655,914	61,494	717,408

* Does not include pipe or tubes made by the electric or acetylene welded processes.
† Does not include hot finished tubes subsequently cold drawn.

PRODUCTION OF MISCELLANEOUS ROLLED PRODUCTS, GROSS TONS.

Products.	1927.	1928.	1929.	1930.	1931.
Hoops	176,300	176,226	204,246	79,844	56,093
Cotton ties and baling bands	323,129	384,200	384,706	46,194	57,112
Long angle splice bars, fish plate bars, etc.	864,992	797,650	924,803	606,390	389,579
Rolled sheet piling	74,793	62,071	102,494	105,693	73,670
Railroad ties	13,826	12,260	13,718	10,614	14,246
Rolled forging blooms, forging billets, etc.	285,527	554,473	527,336	304,090	114,664
Blooms, billets, sheet bars, etc., for export	549	11,139	40,015	9,485	1,960
Blanks or pierced billets for seamless tubes	889,330	1,190,658	1,382,171	1,248,156	732,569
Spike and chain rods, bolt and nut rods, etc.	862,064	860,845	965,694	685,673	422,633
Total	3,490,513	4,055,530	4,545,183	3,096,049	1,862,436

PRODUCTION OF CUT NAILS IN 100-LB. KEGS, 1920–1931.

Years.	Production.	Exports.	Consumption.	Years.	Production.	Exports.	Consumption.
1920	844,583	80,427	758,156	1926	662,403	23,979	638,424
1921	558,854	24,512	514,322	1927	702,836	25,715	677,121
1922	810,206	78,602	731,604	1928	619,784	29,042	590,742
1923	829,604	51,515	778,089	1929	533,833	20,124	513,709
1924	741,668	47,537	694,131	1930	459,923	10,589	449,334
1925	736,111	36,265	699,846	1931	317,275	3,072	314,203

Industrial Men in the Day's News

Clement V. McKaig, Vice President, Carnegie Steel Co.

AFTER several years in charge of sales for the Great Lakes Steel Corp., he returns to Carnegie in the same role.

FOLLOWING graduation from Princeton, he began in the old Park works of Crucible Steel, becoming superintendent of bar mills.

THEN for 22 years he was employed by Carnegie, being made manager of the bar and hoop department in 1929.

CLEMENT V. McKAIG, recently appointed vice president and general manager of sales of the Carnegie Steel Co., Pittsburgh, has returned to the Carnegie Steel Co. from the vice presidency of the Great Lakes Steel Corp., Detroit, which organization he joined in 1930 when he resigned as general manager of the bar and hoop department of the Carnegie company.

Mr. McKaig is a native of Pittsburgh and was educated in the public schools there, later completing classical and scientific courses at Princeton university, Princeton, N. J.

Following graduation, he started in the steel business at the old Park works of the Pittsburgh Crucible Steel Co. When he left the company in 1908 he had worked himself up to the post of superintendent of bar mills.

For 22 years after he came with the Carnegie company he was employed in various capacities, eventually succeeding in 1929 the late I. W. Jenks, general manager of the bar and hoop departments, including the designing, engineering and marketing of all special bar mill products.

This experience was invaluable, and when the Great Lakes Steel Corp. was started at Detroit, Mr. McKaig's experience in bar mill sections for the automotive and other industries brought him the position as vice president in charge of sales for the Great Lakes concern.

Since returning to the Carnegie Steel Co., Mr. McKaig has taken up residence again in Pittsburgh. He is a member of the American Iron and Steel institute, the Society of Automotive Engineers and various social clubs in Detroit and Pittsburgh.

EKAY FORD, for many years representative at Detroit of the Hanna interests, has been elected a vice president of the Hanna Furnace Corp. in charge of sales. He succeeds the late D. M. Eddy of Buffalo.

P. J. Moran of Buffalo has been made vice president of the corporation in charge of operations, and William Kerber, also of Buffalo, eastern district sales manager.

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Warren W. Densmore, for the past three years industrial representative of Arthur Roeder, president, Colorado Fuel & Iron Co., Denver and Pueblo, Colo., has been appointed to the company's service retirement board.

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Norman L. Myers, merchandise manager of the Buffalo office of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been promoted to manager of its appliance division at Mansfield, O. His brother, Sheldon F. Myers, succeeds him at Buffalo.

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Frank J. Sprague, engineer, scientist and inventor, noted for many developments in the railroad and elevator fields, and organizer of the Sprague Electric Elevator Co. and Sprague Electric Co., will be honored by a special meeting at the Engineering Societies auditorium, New York, on his 75th birthday—July 25.

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Henry D. Sharpe, Brown & Sharpe Mfg. Co., Providence, R. I., class of '94, was elected twelfth chancellor of Brown university at a meeting of the corporation, June 21.

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William J. Morris, financial vice president, Youngstown Sheet & Tube Co., Youngstown, O., has been elected president of the Continental Supply Co., a subsidiary of the Youngstown company.

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E. G. Johnson, Homestead Valve Mfg. Co., Coraopolis, Pa., has been elected president of the Industrial Advertising council, Pittsburgh.

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F. J. Jarosch, formerly associated with S K F Industries, Gurney Ball Bearing Co. and D W F Co. of Germany, has been appointed general superintendent of the Roller Bearing Co. of America, Trenton, N. J.

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George A. Spaulding, associated with the sales department of Bliss & Laughlin Inc., Harvey, Ill., and Buffalo, manufacturer of cold-finished steel and shafting, for about ten

years, and more recently Ohio district manager of sales, has been appointed eastern manager of sales, with headquarters ta the company's eastern plant at Buffalo.

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William W. Coleman, president, Bucyrus-Erie Co., South Milwaukee, Wis., has returned from a three months' business trip abroad.

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Fred H. Clausen, president, Van Brunt Mfg. Co., Horicon, Wis., has been elected president of the board of regents of the University of Wisconsin.

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Edwin H. Brown, mechanical engineer, A. O. Smith Corp., Milwaukee, has returned from a business trip of seven and one-half months in France, Germany and Russia.

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G. Clinton Fogwell, for many years identified with the steel industry in New York, Philadelphia and Pittsburgh, has become associated with the Equitable Life Insurance Society of the United States, New York.

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Dr. Edwin Fitch Northrup, vice-president and technical advisor, Ajax Electrothermic Corp. Trenton, N. J., was awarded the honorary degree of doctor of science, by the University of Lehigh, June 14.

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William H. Donner, former head of the Donner Steel Co., Buffalo, has been elected a director of the Fidelity-Philadelphia Trust Co., Philadelphia. He fills the vacancy caused by the death of Samuel M. Curwen, late president of the J. G. Brill Co., Philadelphia.

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Hugh F. McKnight, president and director, Samuel McKnight Hardware Co., Pittsburgh, who was recently elected president of the National Retail Hardware association, was honored June 24 at the June meeting of the Pittsburgh Retail Hardware association.

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J. Frederic Byers, vice president, A. M. Byers Co., Pittsburgh, has been elected to the board of trustees of Carnegie institute, the Carnegie library and Carnegie Institute of Technology. Mr. Byers will fill the vacancy caused by the death of W. W. Blackburn, Carnegie Steel Co.

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A. J. Faraon has joined the sales staff of the Blaw-Knox Co., Blawnox, Pa., as sales engineer for welded process equipment. He is a gradulate of Stevens institute and has been employed previously with the General Electric Co., Schenectady, N. Y., Stone & Webster Inc., Boston, and A. O. Smith Corp. Milwaukee.

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W. S. Guy, traffic manager, Carnegie Steel Co., Pittsburgh, has been succeeded as president of the Traffic club of Pittsburgh by William M. Pomeroy, general freight agent, Pittsburgh, for the Pennsylvania railroad.

Benjamin S. Thomas, general traffic manager, Standard Sanitary Mfg. Co., Pittsburgh, has succeeded Mr. Pomeroy as chairman of the board of governors.

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E. E. Russell, J. I. Case Co., Racine, Wis., has been elected president, Milwaukee Association of Purchasing Agents. Other new officers include: Sam Wilson, Kearney & Trecker Corp., Milwaukee, vice president; E. O. Jones, Belle City Malleable Co., Racine, secretary; G. I. Hartman, Oilgear Co., Milwaukee, national director; H. A. Frank, Sterling Wheelbarrow Co., Milwaukee, local director.

Receive Honorable Mention In Bridge Design Contest

In addition to the prize winners in the "most beautiful" steel bridge contest of the American Institute of Steel Construction, pictured on page 11 of STEEL for June 20, the jury selected the following bridges in the over $1,000,000, from $250,000 to $1,000,000 and under $250,000 classes for honorable mention:

Maumee river suspension bridge, built for Toledo, O., by McClintic-Marshall Corp. from designs by Waddell & Hardesty, consulting engineers.

Croton Lake arch bridge at Croton Lake, N. Y., built by Mount Vernon Bridge Co. from designs made under the supervision of Jay Downer, chief engineer for the Westchester county park commission.

Afton overhead cantilever arch bridge at Afton, Union county, Iowa, built by the American Bridge Co., from plans by the Iowa state highway commission.

May Make All Tin Plate

Washington—If approval of the diet and necessary appropriations can be obtained, the government steelworks will build a new tin plate mill at the Yawata plant, with an annual capacity of 50,000 metric tons, and increase capacity of the present plant to 35,000 tons. Since demand for tin plate in Japan is 80,000 to 90,000 tons a year, this would make Japan self-sufficient, according to Assistant Commercial Attache Dowd at Tokyo, in a report to the department of commerce.

Leechburg Plants Progress

The proposed tin plate plant and shovel works for Leechburg, Pa., sponsored locally, has been favorably received so far. Announcement has been made that nearly $150,000 already has been pledged for the project. Outside interests are reported to have promised to furnish $750,000 of the $1,100,000 needed for the two industries.

To Cut Foundry Wages

New York—Some producers of nonferrous castings plan to reduce labor rates July 1, probably 10 per cent. While the nominal wage scale in New York is $7 a day for a 48-hour week, this scale, it is said, has been shaded at most plants, some making a 10 per cent reduction Jan. 1 and others since then.

—*Photo, Caterpillar Tractor Co.*

STEEL AND FLESH: If costs are the deciding factor, the age of oxen in logging in southern swamps will soon be over and the tractor will blaze the way to a new and substantial market for steel

Obituaries » » »

JOHN WALKER, 88, associate of H. C. Frick in the early days of the Pittsburgh steel industry, died in Pittsburgh, June 23. He organized Wilson, Walker & Co. in 1872 to buy the lower mill of the Union Mills Co. He then purchased the patents of Berry, Courtney & Wilson to make bar iron, railroad car forgings and plates. Fourteen years later the organization was acquired by Carnegie, Phipps & Co., and Mr. Walker was made chairman. He retired from active business in 1888 to become a close associate of Mr. Frick, figuring prominently in the Carnegie-Frick controversy.

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Axel Z. Johnson, 48, chief engineer, Dahlstrom Metallic Door Co., Jamestown, N. Y., died June 15.

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Alexander Winton, 72, founder of the Winton Co. and Winton Marine Engine Co., Cleveland, died at Cleveland June 21.

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James H. Williams, 82, employed for many years by the American Locomotive Works, New York, died at Pittsburgh, June 17.

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Herman Isay, 62, vice president, secretary and treasurer of the Allegheny Foundry Co. Inc., Pittsburgh, died at Hammond, Ind., June 22.

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John H. Bitz, superintendent for many years of the Brinkerton plant of the H. C. Frick Coke Co., Pittsburgh, died June 20, at Greensburg, Pa.

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John R. Powers, 69, proprietor, Powers Belting & Machinery Co., Racine, Wis., died June 17. He was associated with Racine metalworking industries before engaging in the machinery and supply business about ten years ago.

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David L. Ross, 80, co-founder of the Ross Gear & Tool Co., Lafayette, Ind., died recently in a Chicago hospital. At one time president of the Gear & Tool company and its subsidiaries, Fairview Mfg. Co. and Ross Machine Co., he was widely known for his philanthropies.

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J. H. Robinson, foundry superintendent of the Michigan Valve Co., Detroit, and formerly connected with the Campbell-Wyant & Cannon Foundry Co., Muskegon, Mich., and formerly associated with the Clyde Iron Works, Duluth, as foundry foreman and foundry superintendent, died at Muskegon, June 15.

Drawback Is Extended

Washington—The treasury department has announced that its decision of Nov. 18, 1930, providing for a drawback on high speed steel manufactured by the Latrobe Electric Steel Co., Latrobe, Pa., with the use of imported tungsten ore or concentrates, ferrotungsten, and metallic tungsten (including tungsten powder), has been extended to provide for the manufacture of high speed steel by the said corporation with the use of tungsten ore or concentrates, metallic tungsten, in lumps, grains or powder, and ferrotungsten.

Here and There In Industry

BETHLEHEM FOUNDRY & MACHINE CO., Bethlehem, Pa., manufacturer of chemical processing equipment and metallurgical roasting furnaces, has acquired control of the Oil-Elec-tric Engineering Corp., Minneapolis, manufacturer of electric oil burners, and will transfer manufacture of the burners to the plant at Bethlehem. The Minneapolis plant will serve as a direct factory branch. The burner department will be operated as a separate division.

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Art Aluminum Foundry, Chicago, has leased a plant at 3266 Elston avenue, and will move its operations to that point.

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Chicago Malleable Castings Co., Chicago, has bought from the McCord Mfg. Co., Chicago manufacturing right for the McCord journal box and lid.

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Lake Superior Iron Ore association has removed its headquarters from the Union Trust building, Cleveland, to room 212, 3100 East Forty-fifth street, Cleveland.

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Blanchard Machine Co., Cambridge, Mass., manufacturer of grinding wheels, reaming machines and vertical surface grinders, will close from noon July 23 to August 8 for the company's annual vacation.

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Midwest Piping & Supply Co., St. Louis, manufacturer of power piping, has acquired a plant at Third and Lombard streets for production of wrought steel and iron welded fittings. An investment of $150,000 is represented in the building and equipment.

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Western Die Casting & Mfg. Co. has been organized at St. Louis, with A. W. Altvater as president, to manufacture a general line of die castings. The new company has taken over the plant and equipment of the Anderson Die Casting Co., 4946 Southwest avenue.

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Electric Motor & Generator Co., 1292 East Fifty-third street, Cleveland, has erected an unusual sign outside its plant. It consists of a 3000-horsepower alternating current motor on a massive concrete base. The motor is protected from weather by a heavy coating of aluminum paint.

May Employment, Payroll Indexes Off Slightly

Washington — Employment index number for the iron and steel industry for May was 57.6, compared with 59.8 for April and 74.2 for May, 1931, taking 1926 at 100, according to the bureau of labor statistics.

May employment index number for iron and steel and products, not including machinery, was 56.8, compared with 59.1 for April and 73.1 for last May.

May payroll index number for the iron and steel industry was 28.3, compared with 29.4 for April and 62.1 for May, 1931, while in the industry and its allied products except machinery the May payroll index was 30.5, against 32 for April and 60 for last May.

Federal Gifts to Private Business Seen Possible

An advanced idea that the federal government embark on a frank but cautious policy of outright financial aid to private business in order to increase the consumption of materials and employment of men, is gathering momentum, state Ernst & Ernst, accountants, New York. This would be done by the Reconstruction Finance Corp. making gifts to corporations undertaking constructive operations.

Japanese Plants in Red

Washington—Reports to the iron and steel division, department of commerce, state that practically none of the Japanese steel companies is paying dividends and many show heavy annual losses. The government steelworks showed a deficit on operations of over 10,000,000 yen ($5,000,000) for the last fiscal year.

MIRRORS OF MOTORDOM

DETROIT

IT WILL be worth a million dollars, conservatively, to most automobile manufacturers to know when the depression is over. Not necessarily to be tipped off that a swirling upturn is approaching, but merely that hard times have blown themselves out.

Even during a depression, low and medium-low price automobiles can be sold; Ford, Chevrolet, Plymouth and DeSoto have proved that. Used cars in the $200-$300 price range have been moving well.

Over the past two weeks this buying has tended to dry up a little, and production is less buoyant, but the industry is convinced that so soon as many prospective buyers are assured their incomes will go no lower, still greater buying power will be unleashed.

Manufacturers other than those enjoying fair to good sales have been watching enviously, and some are now poised on the brink of a plunge into the lower-price brackets. The vital point is to catch the turn—to avoid wasting new models on a sterile market and yet be ready the instant buyers are.

And it will be a plunge, literally, for many manufacturers, as such a venture will swallow a million dollars readily. Not even the strongest producers can afford to waste a million, and for some this million would be their final and complete stake in the business.

Where a Million Goes Fast

One manufacturer in the middle-price class, normally selling about 25,000 units a year, estimates the cost of jigs, fixtures and dies for two models—a sedan and a coupe—at $600,000 to $700,000. Most makers have four or five base models—sport and deluxe models being base models plus extra equipment. At any rate, a million dollars is a conservative estimate for changing any line.

A good many decisions are in the air now at Detroit. Practically all manufacturers have done preliminary experimental work on something new; the next few weeks in general business will determine whether these plans will go ahead for late summer and early fall maturity.

As previously mentioned in these columns, Chrysler is ready with a new four, probably in the Dodge line; Hudson-Essex also has its light four awaiting production; Willys is designing its 1900-pound car; Auburn has some departures depending upon the results of its recent sweeping price reductions.

New Light Six for G.M.C.?

General Motors, perhaps, is busiest of all. Fisher Body is at work on new body designs for Buick, Olds and Pontiac—designs that will completely differentiate the units of the B-O-P group.

At its Saginaw foundries, General Motors is casting the first 3000 of a new 6-cylinder motor, lighter than anything at present in the General Motors line and of the L head type. There have been various rumors that General Motors would inject a new four or eight in the low-price field, also that the present Chevrolet motor stripped of all gadgets and priced below $400 would be offered. There seems to be an undercurrent that General Motors will bring something new out of the Pontiac plant.

June production totals for General Motors will probably show 35,000 units for Chevrolet and 5000 all told for Cadillac, LaSalle, Buick, Pontiac and Olds. The tentative schedule of Chevrolet for July is 30,000 units, for August 25,000 and for September 20,000, completing the run on the 1932 line. Other General Motors units will be shut down, or practically so, through much of the summer.

Chrysler continues in relatively the best position of any group, chiefly because Plymouth and DeSoto have been touched by the spark which distinguishes mediocrity from genius. Ten days ago Plymouth set an all-time record by assembling 1543 units in one day, and last week it shipped 8000. This spurt was partially in anticipation of a shutdown of a few days over the July 4 period.

An important new policy by Chrysler, which also denotes its confidence of a better market, is that of storing its scrap instead of accepting present low prices. In normal times Chrysler has about 5000 tons a month to offer. It has room for storing up to a half million tons, and under a revised setup for plant handling, can throw down its accumulation at practically no additional cost.

Borings, short turnings, machine shop turnings, compressed bundles and heavy melting steel are what this interest is beginning to pile. Chrysler engineers have figured that in 1922 the price of cast borings was 46 per cent of pig iron, whereas today borings bring only 15 per cent of what pig iron costs. In 1922 the open-hearth grades were 42 per cent of the billet price; today the ratio is 17 per cent.

Ford Holds at 5000 Daily

Ford production continues on the under side of 5000 units daily, 5 days a week, indicating a June output—for the United States—of approximately 100,000. This will be almost evenly divided between the four and the eight. Ford last week was operating eight of his ten open-hearth steel furnaces. National Steel, incidentally, which has been having three of its six open-hearths on, is taking one off, having built up a stock of ingots.

EDITORIAL

Open Prices Are Best for Buyer and Seller

EVERY manufacturer is deeply concerned with the price he pays for materials, supplies and services. To his mind prices to be fair should not be too high or too low and should be uniform to purchasers of the same class.

In the steel industry too much attention has been given to the level of prices and not enough to their uniformity. If the experience of all sales of steel could be compiled and the results on the attitude of the purchasers analyzed, it would be found that the principal cause of distrust and suspicion is not the level of prices but the belief that price discrimination is common practice.

Consider the case of a manufacturer of screw machine products, stampings, plate and structural fabricated equipment, or other products of steel. The president of Company A is not deeply concerned whether the price of steel is 1.50c, 1.60c or 1.70c, provided he pays the same price that is paid by his competitors, companies B, C and D. But let him gain a suspicion that B, C or D is receiving a price advantage through preferential quotations and he will not rest until he too has been granted "special" treatment. In recent years this has been the basis of much of the so-called "chiseling" of prices.

Many steel sellers recognize the shortcomings of the present pricing policy. Some of them are trying to correct it, but the task is not easy because the roots of the existing system go deep. Nevertheless a change is imperative. Manufacturers who buy steel should insist on a more enlightened price policy. They are entitled to a system that is free from secret concessions. They want a schedule that defines the differentials for quantity and enables all customers to deal openly with their suppliers.

Above-Board Price Policy Would Help to Equalize Profits

A plan guaranteeing open prices to all customers is not inimical to the interests of the sellers. In fact it would do as much as any single development to help bring prices into proper relation with the cost of making and distributing steel. Today steelmakers know their costs more accurately than at anytime in the history of the industry. If customers could purchase according to a price schedule that inspires confidence that all are being treated alike, they would be more willing that the seller receive enough to insure a fair profit.

Urgent as is the need for a solution of the problem, it cannot be done overnight. Granting that steel sellers are more receptive than ever before to the idea of modernizing their price policy, they must proceed cautiously. The details of base price, and discounts, extras, differentials or other devices for handling the elements of quantity, size, finish, etc., are numerous and complicated. However they need be no more intricate or puzzling in a system of open prices than in the existing schedules. Probably experience will yield opportunities for simplification.

One of the few cases of open price policy in the steel industry is found in the selling of steel rails. For this highly specialized product the stability of prices, which could not exist under a plan of "confidential" quotations, has been of great value to the railroads and to the steelmakers.

Branches of Steel Industry Are Beginning To Modernize Price Systems

In recent weeks the cold-finished branch of the steel industry introduced a price plan in which the cost of production and distribution is reflected directly in quotations and all customers are placed on a parity in that they know what quantities are necessary to entitle them to certain prices. An advance in the mechanics of price schedules also is found in the action of hot-rolled strip steel producers in establishing one base price to supplant the two existing before. From time to time minor refinements in the price schedules of several other steel products have been introduced.

These are important steps in the right direction. They are particularly gratifying because they indicate a tendency to view the function of pricing from the standpoint of customers, as well as from that of the mill. Producers of all steel products should attack the problem vigorously. If sellers of sheets, plates, bars, shapes, wire, etc. will undertake to improve their price policies, it is likely that out of the various independent group efforts will emerge a plan that will merit wide adoption.

For the good of consumers and sellers alike that plan should and must embrace the principle of open prices. Whether it be fair or unfair, a secret price always gives rise to suspicion. Expose it to the light of public scrutiny and it cannot long remain unfair.

THE INDUSTRIAL DIAL

Published in the last issue of each month as part of
The Business Trend Section of STEEL
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REMEMBERING that the upturn in the depression of 1921 occurred in August of that year, it is interesting to view the situation as it appeared a few months prior to that date. In our issue of June 30, 1921, this publication sized-up the outlook as follows:

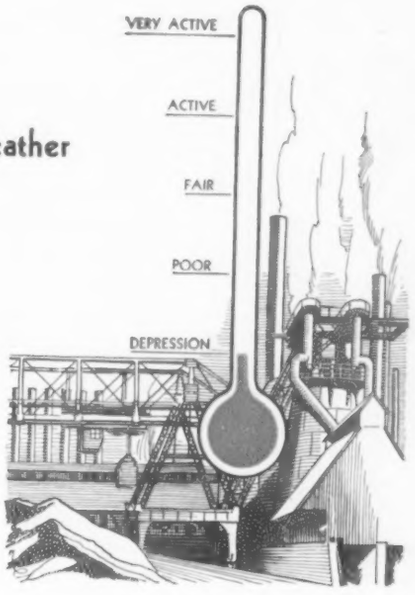
Favorable factors: Prospect of better crops, rapid improvement in financial conditions, drastic cut in production creating a vacuum of demand, rising car loadings, better railroad earnings, normalizing of wages and prices, and improved conditions in Europe.

Unfavorable factors: Credit frozen in unmoved goods, further weakness in cotton and many other basic commodities for which "liquidation was thought to be completed," crippling of buying power due to unemployment, severe deflation of farm products, delay in congressional action on taxes and tariff, prospects of passage of bonus bill and over-expanded condition of certain industries.

Today, as we approach the midyear, the general situation is somewhat similar to that of June 30, 1921. Now, as then, the financial system has been bolstered, an accumulated demand exists, and wages and prices have been liquidated. But car loadings and railroad earnings have not improved, nor have conditions abroad shown marked betterment. As for the unfavorable factors, everything noted in the summary for 1921 applies with equal force in 1932.

The comparison indicates that today the country is not quite as far along on the road to recovery as it was on June 30, 1921. However, the difference probable is equivalent to not more than a few months of constructive developments.

Industrial Weather



TREND:
Uncertain

The Barometer of Business

Industrial Indicators

	May, 1932	April, 1932	May, 1931
Pig iron output (Daily average, tons)	25,282	28,524	64,355
Machine Tool Index	37.5	37.1	103.3
Unfilled orders (tons)	2,177,162	2,326,926	3,620,452
Ingot output (Daily average, tons)	42,593	47,685	96,365
Dodge Bldg., awards in 37 states (sq. ft.)		13,886,600	38,940,000
*Automobile output	185,000	154,823	315,115
Coal output, tons	18,394,000	20,300,000	28,333,000
Business failures; number	2,788	2,816	2,248
Business failures; liabilities	$83,763,521	$101,068,693	$53,371,212
Cement production, Bbls.	5,478,000	4,847,000	14,006,000
Cotton consumption, bales	332,439	367,280	465,770
Car loadings (weekly average	521,939	554,578	747,296

*Estimated.

Foreign Trade

Exports	$132,000,000	$135,236,000	$203,970,000
Imports	$112,000,000	$126,567,000	$179,694,000
Gold exports	$212,229,000	$49,509,000	$628,000
Gold imports	$16,715,000	$19,271,000	$50,258,000

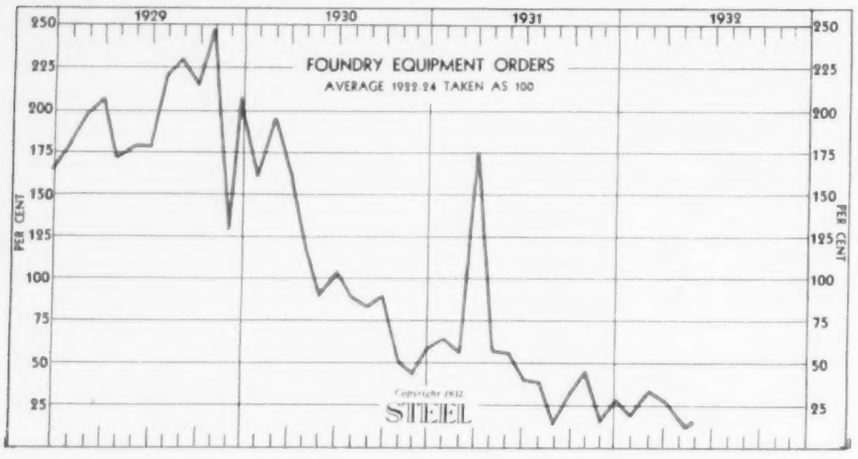
Financial Indicators

	May, 1932	April, 1932	May, 1931
25 Industrial stocks	$77.94	$93.43	$199.46
25 Rail stocks	$14.16	$18.88	$68.69
40 Bonds	$57.00	$61.94	$83.19
Bank clearings (000 omitted)	$20,410,532	$22,534,684	$36,795,631
Commercial paper rate N. Y. (per cent)	3-3½	3½-4	2-2½
*Commercial loans (000 omitted)	$6,678,000	$6,783,000	$7,885,000
Federal Reserve ratio, per cent	64.4	69.3	85.3
**Railroad earnings	$20,621,017	$32,289,300	$39,074,311
Stock sales, N. Y. stock exchange	23,151,047	31,402,988	46,663,292
Bond sales, par value	$216,621,400	$254,182,750	$241,287,800

*Leading member banks Federal Reserve System.
**April, March and April, respectively.

Commodity Prices

	May, 1932	April, 1932	May, 1931	Monthly aver. 1913
STEEL's composite average of 14 iron and steel prices	$29.62	$29.75	$31.37	$26.32
Bradstreet's index	$6.68	$6.91	$8.64	$9.21
Wheat, cash (bushel)	72c	73c	95c	92c
Corn, cash (bushel)	46c	49c	78c	51c
Petroleum, crude (Bbl.)	90c	90c	57c	$2.50



	1932	1931
May	18.0	54.1
April	13.9	57.7
March	27.9	174.4
Feb.	32.9	54.7
Jan.	20.5	65.3

It may be reasonable to say that on the basis of this comparison of the status of business at the two midyear periods, pronounced signs of recovery should appear not later than September or October of this year.

Ignoring the time element, the outlook is better today than in 1921. The accumulated demand is decidedly greater, because the suspension of buying has extended over a longer period and the ordinary requirements of the nation are larger. Moreover, there is no problem of disposing of wartime surpluses such as that which complicated the situation in 1921.

Where Business Stands

Monthly Average, 1931 = 100

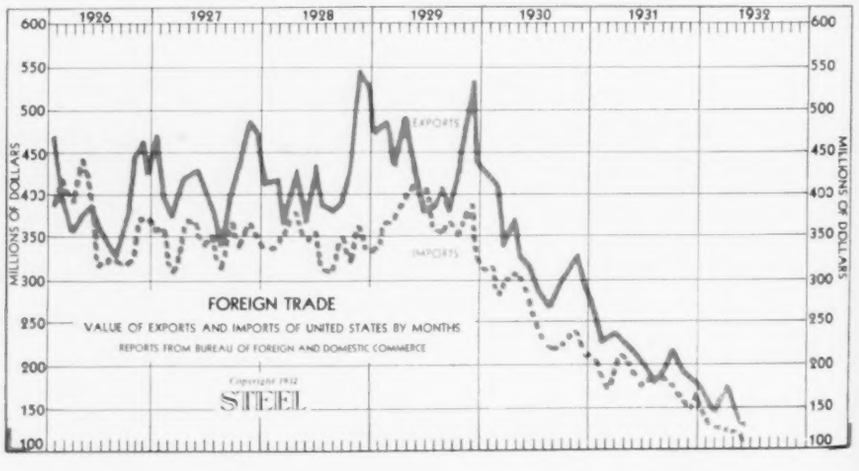
	May 1932	April 1932	May 1931
Steel Ingot Output	53.2	59.6	120.4
Pig Iron Output	50.5	57.0	128.6
Freight Movement	72.9	77.4	103.3
Building Construction	.....	45.5	127.7
Automobile Output	87.7	75.1	160.1
Wholesale Prices	76.3	78.9	98.6

Foundry Equipment Orders Gain After Steady Decline Since February

After declining steadily since February, foundry equipment orders in May turned upward. According to the report of the Foundry Equipment Manufacturers' association the index of net orders stood at 18.0, compared with 13.9 in April and with 54.1 in May last year. The index of shipments was 24.5 against 21.4 in April and 118.6 in May, 1931. The index for unfilled orders was 19.7 compared with 24.4 in the previous month.

Foreign Trade Declines in May; Favorable Trade Balance Maintained

Although the total value of this country's foreign merchandise trade declined sharply in May, the favorable trade balance of $20,000,000 represents an increase of $11,000,000 over the previous month. According to the bureau of foreign and domestic commerce, exports in May were valued at $132,000,000, the lowest for any May reported since 1911. May imports at $112,000,000 continue to seek new low levels, having declined nearly $15,000,000 below the previous month.



Exports	
May, 1932	$132,000,000
April, 1932	135,236,000
May, 1931	203,970,000

Imports	
May, 1932	$112,000,000
April, 1932	126,567,000
May, 1931	179,694,000

CONTINUOUS GAS CARBURIZING—A NEW TECHNIQUE

BY H. M. HEYN
Sales Engineer, Surface Combustion Corp., Toledo, O.

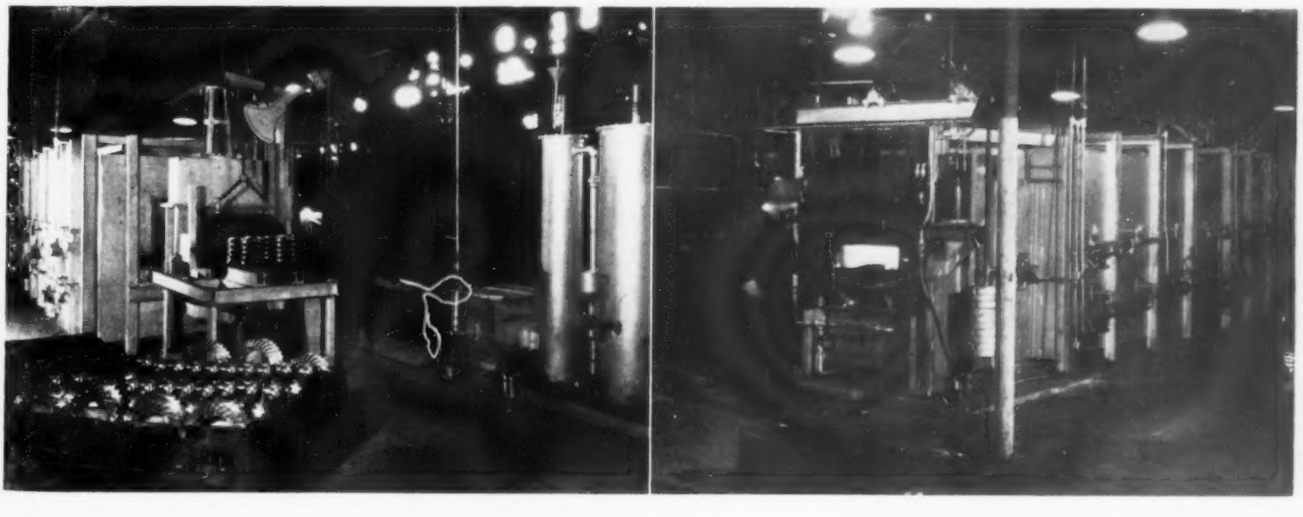
IN THE manufacture of machined parts, the art of carburizing steel is a fundamental operation, being a means by which it is possible to use for exacting service material that can be machined easily. During the process of carburizing the material develops desirable wear-resisting properties on the surface with strength and shock-resisting properties sufficient to stand up under the conditions of severe usage.

The batch-type method for carburizing has been to pack the steel in suitable containers with carbonaceous materials, fasten a cover to the container in such a way as to prevent the infiltration of outside gases, then raise the temperature to a suitably high point, and hold it at this point for a definite length of time, depending upon the depth and character of the case desired. Carburizing by this method is dependent on the character and uniformity of the compound; great care must be used, therefore, to establish a proper procedure for handling the compound to obtain satisfactory results. In spite of the care that is taken many variables exist which are difficult to control.

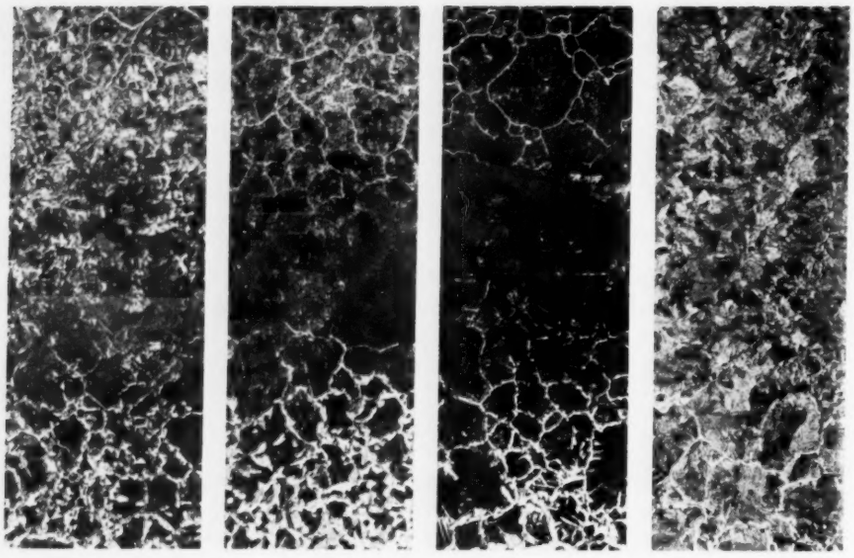
For a number of years improvement has been sought in this field, in a process for carburizing with gaseous atmosphere. Such an atmosphere would be of uniform composition, easily controlled, always fresh and theoretically desirable. As a result of the work which has been done on the subject of gas carburizing many valuable contributions of considerable commercial importance have emerged. The complexity of the possible chemical reactions involved has brought about the ingenious application of mechanical equipment and atmospheric controls which characterize the present status of gas carburizing.

Until the present time, attention seems to have been centered upon the development of a suitable batch-type operation by means of which the treatment of one lot of material is completed, before the next begins. This was felt to be satisfactory for many purposes. However, the trend in production is along the line of the continuous movement of materials through the plant; therefore, it seemed necessary that attention should be given to the development of a continuous process that would adapt itself to the progressive production requirements of modern industry. The realization of this has led to the development of the continuous process for gas carburizing.

As a result of considerable study and research work in the laboratory, the Eutectrol process for continuous gas carburizing has been developed by the Surface Combustion Corp., Toledo, O. This process is interesting not only from the theoretical and scientific standpoint, but also because it lends itself so well to industrial shop conditions that demand a continuous flow of



CHARGING ring gears (left) into purging chamber of continuous gas carburizing furnace. An operator removes the gears (right) from the cooling chamber at the discharge end. This furnace is operated in the plant of an automotive axle builder



Photomicrographs showing different types of case obtainable with the continuous gas carburizing process. Accurate control of the furnace permits close regulation of case depth

carburized parts in a production line.

Shortly after the process was developed, a furnace employing the method was installed in the Newcastle, Ind., plant of the Chrysler Corp. for carburizing steering worms and sectors. Before installing this furnace, however, several vital factors were considered, which might be listed as follows:

1. First cost.
2. Economy and simplicity of operation.
3. Cleanliness, an important factor in view of the fact that economy demanded the insertion of the entire heat treating unit in its proper place in the machine line.
4. Uniformity of case depth and carbon concentration, of interest since comparatively slight variations produced serious changes in size and spiral form.
5. Rate of carbon penetration.
6. Facilities for direct quenching from the carburizing furnace muffle.

The contract for the purchase of the furnace called for a capacity of 120 steering worms and sectors per hour. Installation was concluded during December, 1931, and constant operation since that time has proved highly successful. As a result the Chrysler Corp. has purchased a second furnace used for carburizing free wheeling shafts. Surface Combustion Corp. also has installed a similar unit at Timken Detroit Axle Co., Detroit. The latter furnace is employed to carburize parts and gears used in the assembly of automobile rear axles.

Details of the Eutectrol process of gas carburizing may be summarized as follows: A hydrocarbon gas which contains from 8 to 10 per cent carbon dioxide is mixed with the products of combustion of a gas fired furnace. These mixed gases are introduced into a muffle containing work to be carburized, in such a manner that they will flow through the muffle in the same direction as the work. The work then is moved progressively through successive temperature zones of the furnace. The hydrocarbon gas begins to break down into its constituents of hydrogen and carbon in the preheat zone, so that the work to be carburized soon becomes covered with a deposit of carbon. The deposition of this carbon is regulated carefully so that it is made to occur on the surface of metal to be carburized, rather than on the walls of the muffle through which it is passed. The presence of flue gas in this first zone of the furnace serves as a desirable diluent for the rich carburizing gas.

Carbon Monoxide Forms

As the work, now covered with carbon, moves along through the furnace it comes into the high temperature zone in which the CO_2 of the flue gas becomes active. In this zone CO_2 reacts with carbon to form CO, in accordance with the chemical reaction: $C + CO_2 = 2CO$. This means that the carbon monoxide, which is known to be an active carburizing gas, is being formed progressively at the metal surface directly in contact with the metal to be carburized.

It is important to note that in this zone there is always present, along with the carbon monoxide, a certain amount of hydrocarbon gas that has not broken down completely. The presence of this gas prevents decarburization of the metal in the high hydrogen atmosphere in this zone. By holding this metal in such an atmosphere a progressive diffusion is brought about between the case and the core, necessary for satisfactory carburizing.

General design of the furnace is shown in an accompanying diagram.

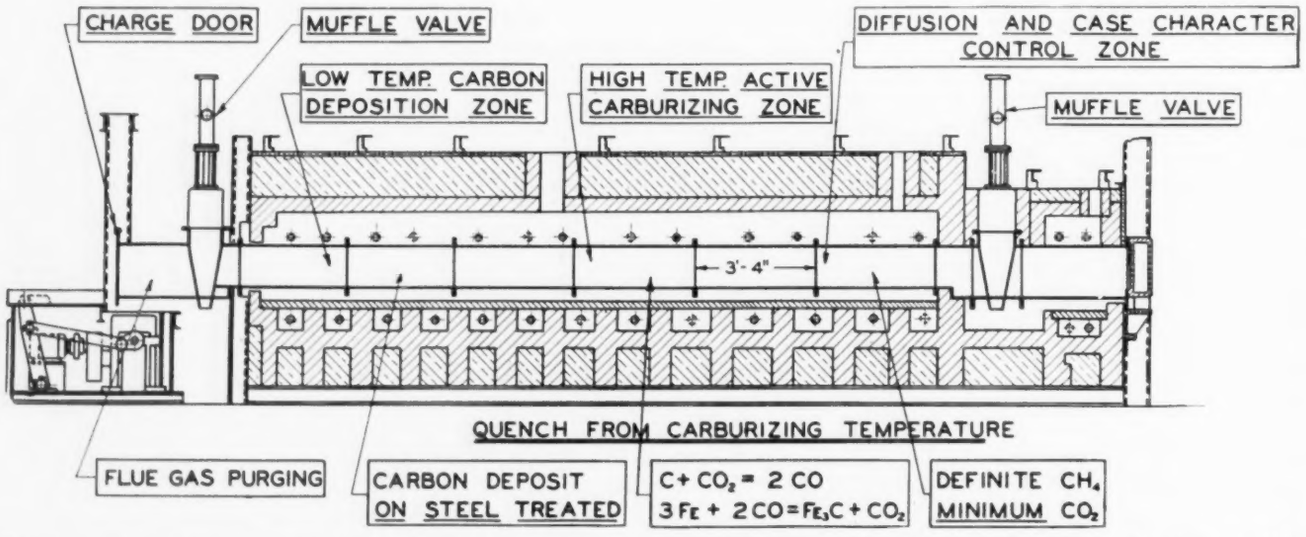

CHARGE DOOR
MUFFLE VALVE
LOW TEMP. CARBON DEPOSITION ZONE
HIGH TEMP. ACTIVE CARBURIZING ZONE
DIFFUSION AND CASE CHARACTER CONTROL ZONE
MUFFLE VALVE
3'-4"
QUENCH FROM CARBURIZING TEMPERATURE
FLUE GAS PURGING
CARBON DEPOSIT ON STEEL TREATED
C+ CO2 = 2 CO
3 Fe + 2 CO = Fe3C + CO2
DEFINITE CH4 MINIMUM CO2

Diagram of furnace showing three temperature zones, purging chamber at charge end and cooling chamber at discharge end. Burners fire above and below the muffle

It comprises a muffle chamber extending throughout the furnace length, ending at the charging end in a purging chamber, and at the discharging end in a cooling chamber, which may be a holding chamber, if desired. Both of the small chambers are separated from the main body of the muffle by gas valves which make the muffle gas tight. The outside doors, at the opposite ends, are made tight by having a machined edge which is held against the sides by a suitable cam arrangement.

Work is carried on alloy grids or trays sufficiently rigid to carry the load. The grids ride on rails and rollers through the muffle, the movement being actuated by a suitable pusher arrangement. The discharge chamber can be arranged so that it may be held at temperature to enable direct quenching of the carburized parts without subsequent reheating.

The furnace is heated by gas burners firing above and below the muffle. Temperature is controlled by automatic regulators actuated by thermocouples placed at three different points in the muffle. The mixture of carburizing gases is introduced at the charging end of the muffle, both above and below the work so as to flow concurrently with the work throughout the entire length of the muffle. The outlet gases are burned at the discharge end of the furnace. A unit of this type will occupy about 60 per cent of the floor space required by a pack furnace of similar net tonnage.

Details of Operation

Operation of this furnace is as follows: A loaded grid is placed in the chamber at the charging end of the furnace. After the outside door is closed, the chamber is purged free from air with flue gas. When the two inner doors or valves are raised simultaneously, the pusher mechanism moves the load into the furnace, and after the muffle has been filled, a corresponding load is moved out into the cooling or holding section. After lowering these inner doors, the discharge load may be removed when it has cooled sufficiently or held at temperature for quenching.

In this continuous gas carburizing process, certain economical advantages seem apparent, including lower first cost of unit, absence of compound handling systems, less labor for loading, elimination of expensive containers and fuel saving due to reduction of gross materials being heated. Furthermore, where direct quenching is required, a definite holding zone is provided, thus eliminating labor for reheating operations.

The process further offers a method of controlling the type of case to be produced on the surface of the steel. This control is brought about by a regulation of the proportion of hydrocarbon gas and flue gas used for the carburizing mixture. Changes in the proportions of these gases are registered directly in the type of carburized case produced, whether a low-carbon hypoeutectoid, a higher carbon eutectoidal, or a still higher carbon hypereutectoid case.

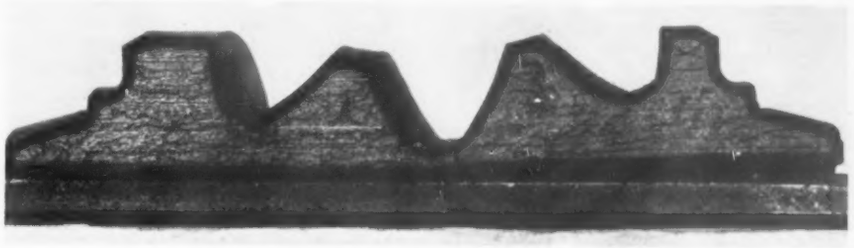
It is possible also to withdraw for analysis from the outlet end of the muffle a small amount of gas that has passed through the carburizing reactions. By means of a special method of analysis of these gases it can be determined at any time what the exact carburizing conditions are within the furnace proper, and what changes may have taken place due to mechanical difficulties or other causes. A constant proportion of gases drawn from the muffle in this way, and analyzed continuously permits a continuous chart record of the carburizing conditions at all times. This chart is similar to the well-known pyrometer continuous record.

By means of this process it has been possble to produce a material of high uniformity, not only within the piece itself, but also from piece to piece throughout an extended run of material through the furnace. This is illustrated by accompanying photomicrographs of typical cases produced during an extended run of this furnace. They show different case depths due to different time cycles, but each case was produced under similar conditions. The entire series of each lot was so nearly alike as to be almost indistinguishable. Steel used was S. A. E. 1020, the only difference noted in depth of case being due to fine grain in the steel, but even so only amounting to 0.002-inch.

Rate of carburizing by this method is shown by the fact that case penetration of 0.045-inch can be obtained in three hours, at a temperature of 1675 degrees Fahr. with S. A. E. 2315 steel. This is about three times the usual rate in pack carburizing.

Diffusion between case and core has been found to be uniform and gradual, indicating good bond between the two. The usual sharp line of demarcation so common where carbon monoxide alone has been used as the carburizing agent, is absent. Uniformity of this diffusion is maintained regardless of the amount of carbon in the case, and is as noticeable in the hypoeutectoid case produced as in the hypereutectoid or eutectoidal cases.

Attention should be called also the fact that the process is clean. By proper regulation of the ratios of the carburizing gases, it is possible to bring the work from the furnace without any free carbon on it, so that is clean and in condition for the next operation.



Fracture of steering worm, etched to show uniformity of hardened case. Steel is S. A. E. X1314. Illustration is approximately actual size

Gage Design Approved as American Standard

An American standard for plain and thread plug and ring gage blanks has been approved by the American Standards asssociation. This standard, developed by the American gage design committee, includes terminology and details of construction for plain cylindrical plug gage blanks and handles; thread plug gage blanks and handles; plain ring gage blanks; and thread ring gage blanks. The standard also covers taper plug and ring gages for checking taper lock handles and gaging members.

The American gage design committee, formed in 1926, was not set up under the auspices of any particular organization, but consists of a representative group of manufacturers and users and gages. When the report was completed, it was first printed by the bureau of standards as miscellaneous publication No. 100, and placed at the disposal of industry. After some time it was approved by the bureau of standards as a commercial standard, and recently it was submitted to the American Standards association for approval as American standard.

Pratt & Whitney Co. and Taft-Peirce Mfg. Co. relinquished their patent rights to the tri-lock plug gage design and a single-unit thread ring gage locking device, respectively, thus making it possible to incorporate these two designs in the recommendations of the committee.

Steel Industry Will Profit From Experience of 1931

LEAN as 1931 was from a financial standpoint, yet it was highly productive in electrical developments. Despite reduced operating schedules labor contributed materially to and executives labored with problems which confronted the steel industry and the lessons learned will have an important bearing on the future of the industry.

This fact was brought out by W. H. Burr, electrical superintendent, Lukens Steel Co., Coatesville, Pa., at the opening session of the twenty-eighth national meeting of the Association of Iron and Steel Electrical Engineers in Pittsburgh, June 20-23. The meeting also marked the twenty-fifth anniversary of the association as an international organization which was proposed by J. Farrington, electrical superintendent, Wheeling Steel Corp., Steubenville, O., and 27 other electrical and mechanical engineers, April 26, 1907.

J. D. Donovan, electrical and mechanical superintendent, Republic Steel Corp., Massillon, O., was elected president to succeed J. J. Booth, electrical superintendent, National Tube Co., Gary, Ind.

W. E. Miller, electrical superintendent, Bethlehem Steel Co., Johnstown, Pa., was named first vice president, and W. H. Burr, electrical superintendent, Lukens Steel Co., Coatesville, Pa., second vice president. J. H. Van Campen, chief engineer, Youngstown district, Republic Steel Corp., Youngstown, O., was elected treasurer, and J. A. Clauss, chief engineer, Great Lakes Steel Corp., Detroit, secretary.

New Directors Chosen

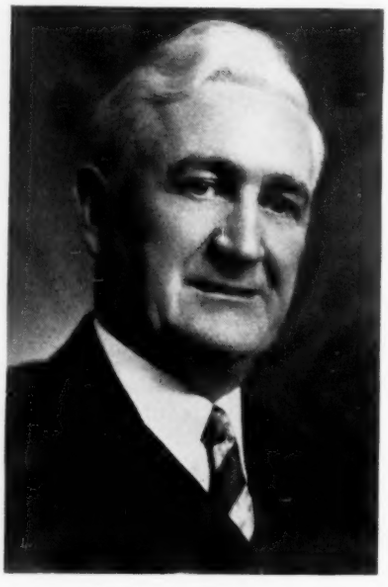
G. R. Carroll, electrical superintendent, Jones & Laughlin Steel Aliquippa, Pa., was elected director at large. The following were made directors: H. D. Esterly, electrical engineer, Alan Wood Steel Co., Conshohocken, Pa.; E. C. Marshall, electrical superintendent, Youngstown Sheet & Tube Co., Indiana Harbor, Ind.; R. F. Sanner, assistant electrical engineer, Carnegie Steel Co., Duquesne, Pa.; W. H. Gilbert, electrical and mechanical department, Tennessee Coal, Iron & Railroad Co., Fairfield, Ala.; A. D. Adams, assistant-general superintendent, Spang, Chalfant & Co. Inc., Pittsburgh; J. L. Miller, combustion engineer, Carnegie Steel Co., Youngstown, O.; P. F. Haberstick, safety engineer, Wheeling Steel Corp., Wheeling, W. Va.; and A. L. Foell, chief engineer, Arthur G. McKee & Co., Cleveland.

Main roll drives sold during 1931 totaled 63, Mr. Burr stated, or about half the number of the previous year, and represented 119,325 horsepower. Not since 1923 has this total horsepower dropped to such a low level, he declared. Not only do the statistics disclose an increase in the horsepower rating but a trend toward higher voltages on alternating-current drives. He mentioned that one-fifth of the total horsepower of the motors purchased in 1931 was consigned to Soviet Russia.

Application of special alternating-current squirrel-cage motors for driving roller and catcher tables on sheet and tin mills was stamped by the speaker as the principle development of the past year. To show the extent to which welding has grown in the fabrication of cranes, the speaker mentioned that one manufacturer has built and placed in service over 600 crane units consisting of one-piece trolley frames, one-piece end trucks and completely welded girders.

Improve Insulated Wire

The development of new types of insulating machines has made possible the manufacture of rockbestos round magnet wire in sizes from 15 to 28 inclusive, with no greater overall diameter than doube-cotton covered wire. Mr. Burr pointed out that the superior insulating qualities of asbestos need not be sacrificed for want of proper space, or the excessive expense of redesigning.



J. D. Donovan

Elected president of Association of Iron and Steel Electrical Engineers. He is electrical and mechanical superintendent, Republic Steel Corp., Massillon, O.

Progress in the art of arc welding and in the types of alloys used was described by G. E. Doan, associate professor, metallurgical engineering department Lehigh university, Bethlehem, Pa. In citing the advantages of welding and the attempts being made by scientists in testing welded joints, he showed by slides various methods used in welding plates, large girders, pipe lines and more complicated shapes.

First place today, the speaker emphasized, must be given to the improvements in the quality of weld and speed of operation which accompany the use of heavily-coated electrodes for the welding of steel parts. The ductility of arc deposited steel as measured in the tension test, he declared, has been increased 100 per cent or more, or from about 5 to 10 per cent in a 2-inch length up to 20 to 30 per cent.

Application of cellulose or fusible mineral substances as electrode coatings, which envelope the arc and crater and diminish the amount of oxide and nitride entering the weld, thereby eliminating the hardening and embrittlement upon cooling, was cited by the speaker as the most important development in recent years. One of the remarkable accompaniments of the process is an increase in the speed with which the welding is done. Bare electrodes deposit metal at the rate of 5 to 10 pounds an hour whereas heavily coated electrodes will deposit from 25 to 30 pounds in the same time.

In commenting on Mr. Doan's paper, W. H. Burr discouraged the use of electric welding of armature shafts, warning that the electrical windings prevent annealing the shaft. Unannealed shafts, he declared, are worthless for such applications as hot metal cranes.

Not Always Needed

Mr. Doan in his closing remarks stated that annealing of welded sections is not always necessary. If the carbon content is low, he explained, the heat treated zone undergoes little change. If in cast iron the silicon is high and the sulphur low, an anneal will cause the carbon to precipitate as carbide but if the silicon is low, he contended, it might be impossible to effect this precipitation.

In discussing the deseaming of slabs, A. F. Davis, vice president, Lincoln Electric Co., Cleveland, pointed out that the speed of scarifying by gas averages according to present practice from 2 to 5 feet a minute. While no studies have been made on the cost of removing seams electrically, Mr. Davis stated, it is estimated that the expense is 50 per cent less than when other methods are used.

Steel deseamed by an electric arc shows no discoloration after leaving the finishing mill, he declared, because the seams weld themselves shut.

Details of the preliminary report of the control committee of the association covering full magnetic direct-current controllers were presented by E. L. Upp, chairman and electrical superintendent, National Tube Co., McKeesport, Pa. A motion was passed that the report be acepted and the committee continue its work.

The report of the ladle crane committee of the association based on charted details covering the practice at 49 plants and presented by F. W. Cramer, chairman and chief electrical engineer, Republic Steel Corp., Youngstown, O., disclosed many interesting facts from the safety and economic standpoints covering the campaign of main hoist cables on hot metal cranes.

Analysis of the charts presented by Mr. Cramer shows that a majority of ladle cranes are overloaded. It may be that the overloading is even worse than shown, he stated, because of the tendency to figure open-hearth hot metal tonnage as short tons, whereas it is common practice to use 2240 pounds to the ton in these operations. If these figures, he continued, were not obtained from actual scale weights it might be that spouts had been bricked up or the lining changed so that ladles held more than their rated capacity. Some of the larger cranes purchased during the past five years are shown to be overloaded as much as 40 per cent.

Study Design of Sheaves

Another point of interest, as pointed out by the speaker, is that more thought is being given to the design of sheaves and drums to secure the proper diameters and to the lay and reeving of the cable to prevent the ropes from excessive fleet angles or rubbing on each other as they pass. So-called safety cables are being discontinued and the reeving so designed that all cables are used for lifting. The tabulation, presented by Mr. Cramer, shows that only in five of the 49 plants do the cranes hold the ladle while the heats are being tapped and in three of these plants steel center cables are used.

The most important fact disclosed by the report is that in 17 of the 49 plants, the normal life of the ladle crane cables is less than six months. It may be, the speaker explained, that in some of these plants this time has been set as a limit, regardless of the condition of the cable.

J. F. Howe, wire rope engineer, American Steel & Wire Co., Worcester, Mass., in discussing Mr. Cramer's report emphasized that high-grade manganese steel sheaves are being used more widely because of their ability to withstand abrasion. He urged that more data on the reeving of crane ropes be obtained, contending that upon this information depends the possibility of extending the rope life. H. N. Morgan, John A. Roebling's Sons Co., Trenton, N. J., pointed out that more short service ropes are caused by improperly constructed sheaves than for any other reason. Contamination of ropes with dirt is prevented at the plant of the Wheeling Steel Corp., Wheeling, W. Va., as explained by J. Farrington, electrical superintendent, by first reeving on a separate set of drums and thence onto the crane.

Applications and advantages of electronic tubes used in the steel industry described by H. Winne, General Electric Co., Schenectady, N. Y., in the absence of the author, T. R. Rhea of the same company, included pyrometers, shears, tripping devices, electric welders and wire reels. Devices actu-

(*Please turn to Page* 32)

Iron and Steel Electrical Engineers Inspect Latest Mill Equipment

ENGINEERS and operating executives of the iron and steel industry who attended the exposition held in conjunction with the twenty-eighth national meeting of the Association of Iron and Steel Electrical Engineers, had the privilege of inspecting the latest prime movers and auxiliary equipment, both at rest and in operation, coming from the shops of electrical manufacturers. Space was occupied by 45 exhibitors and many sales were reported to have been consummated by those in charge of the displays.

Various products were shown including circuit breakers, oxygen recorders for analyzing industrial waste gases, alternating-current breakers, controls for sheet and tin mill roller and catcher tables, safety switches, photocell control for counting the revolutions and cycles of production equipment, drum switches for slip-ring motors, fuses, brushes, flood lights, reflectors, signaling devices, pressure gages, voltmeters, time controls, humidity recorders, roller bearings, gears, cold rolls, safety lowering switch, oil circulating systems, voltage regulators, induction motors, composition mill bearings, oil circuit breakers, contactors, reduction gear motors, oil testers, conduit and fittings and other miscellaneous equipment.

Show Crane Models

Models of handling equipment displayed by one manufacturer commanded interest throughout the show. One was an ingot stripper crane typical of the company's standard size unit for handling the three types of molds now in commercial use. Another was a ladle crane equipped with an equalizer beam mentioned frequently at the various technical sessions. Two soaking pit crane models were shown, one driven through a worm gear unit and the other through spur gears.

Examination of the various models disclosed that wherever the spur-gear reduction is employed, two to three worm gear reductions are replaced. Mounted on a separate display table was shown in operation a magnet suspended from a crane picking up and dropping steel turnings.

Roller bearings for 4-high mills featured the display of a manufacturer specializing on this equipment. One of the bearings with a bore of 12½ inches, an outside diameter of 25½ inches and 16½ inches wide taken from the side rolls of a 52-inch beam roughing stand had effected the rolling of 402,080 gross tons of sections since its installation Feb. 27, 1927. A backup roll bearing serving a 60-inch 4-high strip mill near the Pittsburgh district and of 23-inch bore, 35½-inch outside diameter and 21¼ inches wide was placarded as having withstood a rolling campaign involving 408,000 gross tons.

Miniature Mill Operated

Photronic tube devices were seen in operation at several booths. At one exhibit where a miniature rolling mill was in operation, the photoelectric cell was employed to actuate the valve controlling the descaling system. In the booth of an electrical manufacturer a magic wand raised from the table caused a light to burn. Another display in this booth created interest among observers. Lifting a coin from a platter brought electronic devices into action and caused a bell to ring until the coin was restored.

Various systems of automatic lubrication were shown mounted on panels, pictorially and in operation. One was equipped with an electrically-driven central pumping unit which delivers the lubricant to two supply lines at high pressure and thence through valves to every bearing in the system. A maker of lubricants exhibited an anhydrous lime base lubricant for roll necks which when applied on a spatula would not be dislodged when subjected to a stream of water under 90 pounds pressure, a condition seldom if ever encountered in rolling mill practice.

Testing Materials Society Reviews Steel Castings

THE American Society for Testing Materials, meeting in Atlantic City, June 20-24, for its thirty-fifth annual meeting, was complimented by its president, Dr. F. O. Clements, technical director of research, General Motors Corp., Detroit, in being able to carry on its activities practically without impairment under trying economic conditions. A slight loss in membership was reported, but the financial showing is favorable.

Cloyd M. Chapman, consulting engineer, New York, completing his term as vice president, was introduced as the new president to succeed Mr. Clements.

Thomas R. Lawson, head of the department of civil engineering, Rensselaer Polytechnic institute, Rensselaer, N. Y., will continue as vice president, while W. H. Bassett, metalurgical manager, American Brass Co., Waterbury, Conn., was named the new vice president. C. L. Warwick, is secretary-treasurer.

New members of the executive committee were selected as follows: H. A. Gardner, chemical engineer, Institute of Paint and Varnish Research, Washington; J. O. Leech, assistant metallurgical engineer, Carnegie Steel Co., Pittsburgh; J. T. MacKenzie, chief chemist, American Cast Iron Pipe Co., Birmingham, Ala.; J. C. Ramage, engineer of tests, Southern Railway Co., Alexandria, Va.; and H. S. Vassar, laboratory engineer, Public Service Electric & Gas Co., Irvington, N. J.

Because of the success of the exhibit of testing instruments and equipment in 1931, the exhibit will be repeated in 1933. Much co-operative work is being performed with other societies, an example being the symposium on steel castings held this year with the American Foundrymen's association.

Analyzes Production, Uses

Steel castings were passed in review for the benefit of engineers, designers and users in this symposium. The industry was represented through a general survey offered by W. C. Hamilton, American Steel Foundries, Chicago, chairman of the committee which arranged the symposium; statistics covering and analyzing production and uses were presented by Granville P. Rogers, Steel Founders' Society of America, New York; and factors covering design, purchase requirements, physical and mechanical properties were followed by intimate and advance technical information all prepared by outstanding authorities in the specialties which they represented.

Zay Jeffries, consulting metallurgist, Cleveland, who presided at the second of two sessions, stated that the symposium served to show how the steel casting industry is helping to obsolete many things now in common use. He complimented the authors, in his closing summary on the judicial manner which marked the entire presentation—no author having appeared as an advocate for a commercial interest, but rather offering his data in the light of general informative value.

The speakers did not spare any shortcomings which they detected in the steel foundry industry. W. C. Hamilton deprecated that false pride which in the past impelled foundrymen to assume their ability to make steel castings, regardless of their size and nature. This, fortunately for progress, has been succeeded by an endeavor to master a special product.

Designing a Better Product

F. A. Lorenz Jr., American Steel Foundries, Chicago, presented a paper on design, pointing out progress made since all foundrymen mistook adverse effects of poor design for faulty foundry technique. In the past, too much effort was made to meet the customer's demand, leading to subterfuges such as chills and other measures often detrimental, which now are avoided through design which gives a better product, more economically produced and capable of greater ultimate service. He detailed those properties of contraction, mass effect, crystallization phenomena and heat transmission which must be understood by the engineer before he properly may design steel castings.

R. A. Bull, Electric Steel Founders' Research Group, Chicago, in his paper on purchase requirements stated that despite the wide diversity of society, governmental and private firm specifications which exist, no conclusions regarding rejection limits to apply to any well-known foundry steels have been developed, with the single exception of Hadfield's manganese steel. Foundries give guarantees not to be found in any approved specifications and requirements as to chemical and physical properties and heat treatments vary with individual contracts in many instances. The fallibility of attached test coupons due to conditions of casting, variations in section from typical casting sections and many other discrepancies were shown in the buying habits of steel castings users.

The inter-relation of the papers on design and purchase requirements induced overlapping discussion. P. E. McKinney, Bethlehem Steel Co., Bethlehem, Pa., stated that buyers often expected a foundryman to give a price on an idea, or a rough drawing and when the finished drawing or pattern was available many non-essentials adding to cost and complicating production were encountered. Closer co-operation is the solution proposed.

John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., stated that there is a disposition to rely less on the physical properties of the test coupon and expect rather to trepan a test specimen from the casting. A mere difference in cooling rates, often will give divergent results.

F. A. Lorenz Jr., stated that present day practical production problems should be considered by buyers. With small orders on 20 to 30 different specifications confronting a foundry on reduced operations, close adherence to chemical variations is impossible, although the foundryman can give the customer what he needs, if left to supply the physical requirements.

In an extensive paper on physical and mechanical properties of cast steel, by C. H. Lorig and C. E. Williams, Battelle Memorial institute, Columbus, O., the range from 0.25 to 0.35 per cent carbon was offered as the normal range of plain carbon steel castings with high and low carbon covering the territory above and below this division. The carbon steels gain in strength and lose in ductility with the addition of carbon and perform in inverse ratio with lowering this element. The variation of carbon cast steels under addition of other constituents and under heat treatment is equal to wrought steel of similar character.

Effects of Alloys

Nickel adds ductility at low temperature and the embrittling effect is decreased in higher temperatures by heat treatment. Addition of copper above 0.5 per cent has been found to improve mechanical and elastic properties. Silicon adds ductility to low-carbon steel while embrittlement at high temperatures is decreased with silicon content. Molybdenum in cast steel increases yield point to a marked degree at elevated temperatures. Vanadium gives highly elastic, shock resistant and wear resistant properties.

Fred Grotts, Continental Roll and Steel Foundry Co., East Chicago, Ind., prepared a paper which was presented by Mr. McKinney. The va-

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rious properties of cast medium pearlitic steels were covered in detail, from data contributed by foundries making these products commercially. These new types of steel range from 0.30 to 0.40 per cent carbon and with additions of from 0.50 to 3.0 per cent manganese with various alloys and have been designed to give from 75,000 to 130,000 pounds tensile strength and various properties for the numerous requirements of special service.

Corrosion resistant steels were surveyed by Jerome Straus, Vanadium Corp. of America, Bridgeville, Pa., who defined this class as essentially alloys of iron and chromium to which different other elements are added to impart properties demanded by special applications. They are finding useful service where exposed to polluted atmosphere, sea water, chemicals, molten salts and metals at both atmospheric and elevated temperatures. Failures may result from either chemical or mechanical causes, due to wrong chemical constituents, faults of design, temperature, abuse in heating and cooling fatigue, changes in structure due to continued exposure or defects of foundry origin. All can be corrected.

Norman Pilling, International Nickel Co., Bayonne, N. J., stated that in corrosion resistant steels the practical application to meet commercial needs has gone ahead of laboratory study. The proper relationship between nickel, iron and chromium is important in choosing the proper alloy for certain requirements.

Too Many Analyses Required

A written discussion by A. C. Jones, Lebanon Steel Foundry, Lebanon, Pa., stated that too many special analyses are requested by cutomers. Consultation with the foundry often will serve the interests of buyers best. The alloy of 18 chromium, 12 nickel, sometimes specified in low carbon will prove better in actual production if the carbon content is slightly increased.

J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., cited the use of 7 per cent chromium iron castings, changed to 18 chromium with 8 nickel and afterwards to 28 chromium, 18 nickel, applied

(*Please turn to Page* 32)

Committees Propose Many Revisions In Ferrous Metal Specifications

AN ERA of scientific achievement is unfolding and the next ten years will see new discoveries, rapid development in utilization and service of new inventions, stated Dr. F. O. Clements, in the annual presidential address, before the American Society for Testing Materials. Industrial vision is being corrected by present conditions and in a few years we will engage in projects not even known today.

New Knowledge Needed

Marked advances are at hand in frozen foods; air conditioning of buildings; cheap magnesium; pipe line extensions for oil, gas and perhaps coal; through highways; synthetic products; and sources of power untapped commercially were noted by Mr. Clements. Many of these point to greater futures for metal industries and new alloys are coming rapidly to meet the need for change. The speaker praised standardization as a servant, and recommended its application to materials and processes, but warned against its application to mental characteristics. A continued search for new knowledge is the need of the present.

A number of important committee reports were presented. John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., reporting for committee A-4, of which Prof. H. M. Boylston, Case School of Applied Science, Cleveland, is chairman, noted new terms submitted in the nomenclature of heat treatment of iron and steel.

Proposed tentative specifications for ferro-tungsten, low-carbon ferro-molybdenum and for molybdenum salts and compounds were approved on recommendation of the committee of which N. B. Hoffman, Colonial Steel Co., Pittsburgh, is chairman.

Change Bessemer Specifications

Because little basic bessemer steel is manufactured in the United States, since raw materials are not suitable for its manufacture, committee A-1 on steel, for which J. B. Young, Reading Co., Philadelphia, reported as chairman, recommended some important changes in standard and tentative specifications. This change which is rather a technical correction approved the inclusion of the term *acid* referring to bessemer steel products ranging from structural steel for buildings to track bolts, hot and cold bar stock, track bolts and splice bars and seamless steel pipe.

In specifications for steel plates of structural quality for forge welding, the maximum limit for nickel shall not apply, but a maximum limit of 0.10 per cent silicon is provided, except when purchaser and manufacturer omit this by agreement. New proposed tentative specifications were submitted for structural steel requiring a high tensile strength and not carried in stock at present by manufacturers.

The importance of testing both the composite strands and the finished cable in wire rope was stressed by A. V. de Forest, American Cable Co. Inc., Bridgeport, Conn., in presenting a paper which the speaker prepared with L. W. Hopkins, Page Steel & Wire Co., Bridgeport. Tests on rope wire and on cable have been perfected to simulate service conditions. These have been built upon the basic principles that the point of maximum stress should be at the original wire surface, the stressed portion is of maximum length, and the stress frequency is high.

Wrought iron rivets are recommended for wrought iron pipe in a change presented by James Aston, A. M. Byers Co., Pittsburgh, vice chairman of the committee on wrought iron.

A change in nomenclature to give standard pipe thickness based on design formula was recommended by a special committee on the standardization of wrought iron and wrought steel pipe and tubing.

Jerome Strauss, Vanadium Corp. of America, Bridgeville, Pa., in presenting his report as chairman of the committee on iron-chromium and related alloys stated that a discontinuance of trade names and classifications according to alloy content is suggested.

The subject of magnetic properties in relation to nondestructive testing was covered in a committee report presented by R. L. Sanford, bureau of standards, Washington, and in a paper of which Mr. Sanford was so-author with J. V. Emmons, Cleveland Twist Drill Co., Cleveland. A complete revision of standard methods of test for magnetic properties is proposed as tentative by the committee.

Affords Inspection Method

The paper reported the attempt to correlate mechanical and magnetic properties of 1.21 per cent carbon tool steel. The conclusion drawn is that each property has its own individuality which is distinct from all other properties, and that when a relationship is apparent between magnetic and mechanical properties it is only for a limited range of heat treatment. This should not be interpreted as detrimental to the value of magnetic tests or analysis. It affords an inspection method capable of application.

makes good steel better

The consistent use and steady sales of Ferro Carbon-Titanium during the lean years of 1930-31 is convincing proof of the acknowledged value of this reliable deoxidizer. Especially true is this in the manufacture of steels for high grade Strip, Auto Body Stock and Plate. Open-hearth operators almost to a man praise Ferro Carbon-Titanium as the final ladle addition for high quality steels.

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Plate Fabricator To Use Welding

BASED on experience of 69 years in fabricating heavy equipment for steel mills, blast furnaces, refineries, and other basic industries, the William B. Pollock Co., Youngstown, O., announces the establishment of a special engineering department to design every type of shop equipment for welded rolled steel fabrication.

For the last ten years, the company has studied the possibilities of this type of construction, and the work turned out during this period demonstrates the strength and economy of the newer process of joining metals.

The accompanying illustration shown an open-hearth hot metal ladle redesigned by the company to utilize rolled steel and arc welding. This ladle has a capacity of 85 tons and weighs 30,000 pounds. The company has built many ladles of the same capacity using riveted cast steel construction in which case the weight was 51,000 pounds.

By redesigning its riveted cast-steel hot metal car for fabrication by arc welded rolled steel, a saving in weight of 10,000 pounds was obtained. This car was illustrated and described on page 38 of the Feb. 15, 1932, issue of STEEL. The saving in dead weight in the new design was achieved with the addition of a tipping mechanism, and the capacity of the car was increased to 140 tons of hot metal. The riveted cast steel unit holds only 115 tons.

With its enlarged engineering facilities, the Pollock company is prepared to design special and standard equipment for every industry.

Testing Materials Society Reviews Steel Castings

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in the upper portion of a cupola lining, which had warped under repeated heating and quick cooling.

The oldest alloy steel, austenitic or Hadfield's manganese steel was described in detail by John Howe Hall. This metal which carries the manganese content up to 10 to 14 per cent gives strength, toughness and great resistance to wear. No difference in quality is found through the employment of either electric furnace or converter melting practice.

The material is brittle until heated to somewhat over 1000 degrees Cent. and quenched in cold water. It gains in toughness under cold working and accordingly is valuable for use in rock crushers, frogs, crossings, ball mill plates and similar service. Quite recently welding rods have been developed which permit welding high manganese steel. By the use of a special welding rod for the manganese casting and another type for rolled steel, welds can be effected between the austenitic manganese casting and structural materials. This permits welding on switch points.

A paper by T. S. Quinn, Lebanon Steel Foundry, Lebanon, Pa., was abstracted by Major Bull. Mr. Quinn states that the steel casting industry in general has benefited by the recent development of fusion welding. Improvements in casting design is one marked benefit. Many economies resulting from welding fabrication might have been attained more readily in an all cast product if foundrymen had been permitted to simplify the design of the original casting so as to make it as cheaply as possible without sacrificing any desirable property or useful construction feature.

Steel Industry Will Profit From Experience of 1931

(*Concluded from Page* 27)

ated by light were described by A. F. Corby Jr., Weston Electrical Instrument Corp., Philadelphia, and demonstrated at the close of the session.

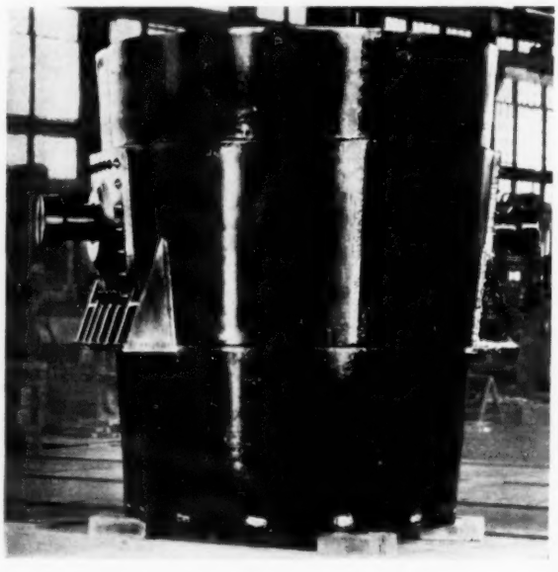
Savings of 50 per cent in the number of kilowatts used in lighting aisleways in industrial plants have been effected by the application of photronic tube control according to W. B. Shirk, steel mill engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., who presented a paper entitled "Profitable Uses for Electronic Devices Responsive to Light in the Iron and Steel Industry." He explained how a $20,000 annual saving had been effected by the installation of a photoelectric limit switch on a strip mill repeater which eliminated cobbles and described devices employed to meter products of combustion for density of smoke and to open and close mine doors.

Reversing and continuous mills are producing a variety of products with speeds and refinements that were considered impossible a few years ago, stated I. S. Nippes, electrical engineer, Elliott Co., Ridgway, Pa., who in collaboration with M. E. Thompson, consulting engineer, presented a paper on "Compensated Motors and Generators." With the increasing demand for larger size machines and increased rating at higher speeds, he said, the use of the compensated machine is being extended in order that the more difficult applications may be met satisfactorily. For driving reversing mills requiring large powers, direct-current motors are the practical solution, he contended, and the Ward-Leonard system gives much quicker reversal and wastes far less energy than any other.

Calculate Motor Capacities

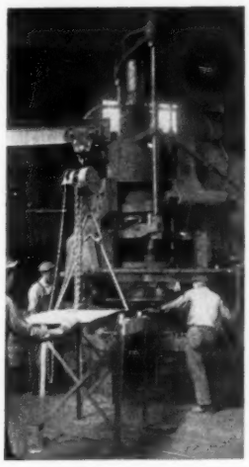
A paper on "Determination of Motor Capacity for Main Roll Drives," by H. A. Winne, industrial engineering department, General Electric Co., Schenectady, N. Y., provoked widespread interest. Not only will the data presented by Mr. Winne assist the steel mill engineer to make estimates of the power required to drive proposed mills but will give him a better understanding of the information needed by the electrical manufacturer to make detailed calculations for a main roll drive.

The general method described by the speaker has proven practical in calculating the capacity required on the large majority of the 2000 main roll drives now in service totaling over 2½ million horsepower. It is not so highly theoretical and mathematical as other methods. No abstract can possibly do justice to the paper; it should be read in full. The author has made an important contribution to engineering literature.



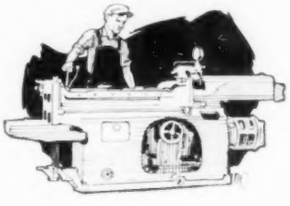
AN 85-ton open-hearth hot metal ladle of arc-welded steel plate construction. It weighs 30,000 pounds, or 21,000 pounds less than a riveted cast-steel ladle of like capacity by the same company

Making the Most of



METHODS AND MATERIALS

STEEL containing 4 to 6 per cent chrome continues to gain in popularity for high temperature service in the oil industry. This alloy, in use in oil refining, gives at least three times the life of plain carbon steel and usually more. Like plain carbon steel, it bulges and gives warning of impending failure, whereas 18 and 8 chrome-nickel steel breaks without any warning whatever. In the past year, the addition of tungsten or molybdenum to 4 to 6 per cent chrome steel has been practiced widely because such additions materially increase the strength at elevated temperatures of this steel. The additions have been in the neighbodhood of 0.50 per cent molybdenum or 1 per cent tungsten. Recently the tendency has been in favor of molybdenum, principally for the reason that the molybdenum addition is cheaper than the tungsten. Oil companies right along are buying good-sized tonnages of 4 to 6 per cent chrome steel containing 0.50 per cent molybdenum, for use as still tubes, high temperature bolts and flanges, valve parts, return joints, etc. This same steel also is in increasing demand for use in high pressure steam lines, in the form of valve parts, flanges, bolts, and studs.



WITH development of broaches to produce internal involute gear tooth forms, automotive manufacturers now find it possible to produce each part with a specified number of teeth by one pass of a broach. These broaches usually are of the pull type and the complete tool consists of a pilot which is followed by roughing and finishing teeth. It operates in a hole bored or reamed to the pilot size, and less than 20 seconds is required from the time of loading until it completely finishes the form on the number of teeth that are required for the finished job.

S S S

Pots made of special analysis steel and finished with a vitreous enamel have been developed especially for nitriding use. This enamel has the property of retaining its elasticity at all temperatures so well that it does not crack or chip off the container during the heating and cooling cycles or during normal handling of the boxes during loading and unloading. Pots covered with this enamel are unaffected by the nitriding gases even after relatively long exposure, and do not adversely affect the dissociation rate. Work nitrided in these containers is proving to be of superior quality.

S S S

In a continuous pickling installation, a maker of automotive parts has introduced an air port at the bottom of his tanks to provide agitation of the acid for pickling some of the parts. The continuous system precluded the equipping of the tanks with standard agitators. The cost of supplying the air to the tanks was found to be negligible in comparison with the results obtained.

S S S

Frozen carbon dioxide, commercially known as dry ice, is being used to shrink bushings and collars before pressing them into other machine parts, thereby minimizing the chances of cocking and shearing.

S S S

Bakelite materials in a number of instances of late have been employed as a covering for steel in place of enamel, lacquer, porcelain, etc. A well-known manufacturer has placed on the market a steel water cooler covered with sheets of this bakelite laminated 1/16-inch thick and cemented to the steel. Steel window sills in pullman cars are similarly covered. Another interesting use of bakelite laminated is in X-ray tables; the table tops, made of plied wood, now are being covered with sheets cemented to the wood. In this use the fact that the bakelite material is warm to touch of the body and also provides minimum absorption of X-rays makes it ideal for this application.

S S S

Electric resistance welding machines can be adapted to the heating of uniformly shaped steel parts which are to be hardened. Uniform heat is obtained at high speed and low cost. Because expansion is in direct proportion to temperature rise, the machine may be so designed that the current is cut off as soon as expansion has reached a predetermined limit. Exceptionally close control of temperature can be obtained therefore.

A LARGE producer of gas refrigerators has given up painting its refrigeration units. After these units have been welded, they are galvanized at a temperature of 850 degrees Fahr. This is severe treatment for a welded refrigeration unit, and it causes some distortion in the units; nevertheless, galvanizing has proved better and more economical than painting.

S S S

In repairing machinery, it generally is necessary to mark the various parts in some way to insure proper reassembly. The best method of marking is to stamp the parts with steel dies, but this is not always practicable. In these cases, a marking paint made of white lead mixed with turpentine to a thin consistency may be used. This paint dries quickly and when dry is not easily removed. It has the advantage of showing up fairly well on greasy surfaces, although it is better that the surfaces be well cleaned with kerosene before marking.

"No need for this expensive finish..."

SUGGESTED SHARON SPECIFICATIONS

RESULT ▼ SUBSTANTIAL PRODUCTION SAVINGS FOR THE MANUFACTURER

It was an important, though unexposed part of a well known, nationally advertised commodity. Examination by one of Sharon's Metallurgists revealed that the manufacturer was using an expensive finish steel for the part, which was galvanized. ▼ After further metallurgical research, a less costly finished steel, but with added special physical characteristics to do the job better, was worked out. Many carloads of this "Sharon Specifications" improved steel have since been used successfully—and at a great saving to the manufacturer. ▼ Just one of many examples of the profitable use that can be made of "Sharon Specifications." Your product merits this experienced Engineering Service which assures the right use of the right steel for the product. ▼ Write for detailed explanation, stating your problem. It will be well worth your while.

SHARON STEEL HOOP CO.—SHARON, PA.

Strip Steels
Hot and Cold Rolled
—
"Nevastain"
Stainless Steels
—
"*Enamelite*"
Enameling Iron
—
Steel Sheets

All parts of this container, except handle and rubber tires, are steel. The parts are shipped knocked down, and easily assembled with bolts. The weight of the container is 50 pounds

Large Uses of Steel In Small Ways

220th Article ◆ Sanitary Containers

MANUFACTURE of household equipment, aside from those units actually used within the house, requires a large tonnage of steel. New devices for conveniences about the house are continually appearing, and much ingenuity is manifest in many articles made of steel. It seems to be a simpler, more expeditious and profitable venture to discover certain needs, and then to supply the necessary equipment, than to improve on equipment already in use.

Steel Cart Developed

An Ohio manufacturer of road maintenance equipment turned his attention some time ago to making a patented specialty, a two-wheeled, rubber-tired, sheet steel cart for sanitary, odorless handling of garbage. The sales were rather encouraging, and a considerable amount of steel was needed, but recently conditions appeared less favorable, and little promotional work was done. Interest, therefore, does not center in the steel consumed by the manufacture for this purpose at present, but in the device itself, and the method selected to market it.

The parts are made up at the factory, with the sheets forming the top, sides and bottom of the cart, flanged and perforated for bolts, and shipped knocked down. This is unusual for an all-steel article of this size and type, yet the assembly is so simple that it can be performed in a kitchen, with the aid of a wrench and screw driver.

The bottom sheet is laid on a floor or table, and the two end pieces bolted to it. The side pieces are next bolted on, and then the hinged top. Axle rods are bolted on the sides; the wheels are locked in position on the axles with cotter pins, and nickel-plated hub caps are then attached. The handle, which extends down to form legs to support the rear-end of the cart, also is bolted on. There are only 11 main parts. Under the cover is a spring clip, which holds a pasteboard box of deodorant crystals.

The container weighs 50 pounds complete, and has capacity for two standard-size garbage pails. It is made of No. 24 gage galvanized sheets; is 16½ x 16½ inches, and 33 inches long. The claim is made for it that it cannot easily be tipped; animals cannot open the lid; that it is odorless.

New officers for the Rochester, N. Y., chapter of the American Society for Steel Treating have been elected as follows: Chairman, J. I. Reid, in charge of alloy sales, Symington Co.; vice chairman, G. A. Lux, chief chemist, Railway Signal Co.; and secretary-treasurer, I. C. Mathews, research laboratories, Eastman Kodak Co.

Introduces a New Bronze Alloy

A NEW silicon-bronze alloy containing tin, patented and trademarked under the name Herculoy, has been announced by Revere Copper & Brass Inc., 230 Park avenue, New York. The alloy possesses the advantages of strength and corrosion resistance, with special properties which render it more readily adaptable to fabricating operations than is usual with silicon bronzes. Its strength is said to be comparable to that of low and medium carbon steel and its corrosion resistant qualities approximately those of pure copper.

The material is nonmagnetic and exhibits a simple, single-phase structure similar to that of alpha brass, thereby permitting through proper annealing a range of physical properties intermediate between the limits set for elongation and tensile strength. Tensile strength limits range from 60,000 pounds per square inch and 80 per cent elongation in 2 inches for full annealed cold-rolled sheets, to a maximum of 120,000 pounds per square inch with a corresponding decrease in elongation for cold-drawn rods. Intermediate values are obtainable in hot-rolled sheets, light and full annealed cold-rolled sheets and hot-rolled rods.

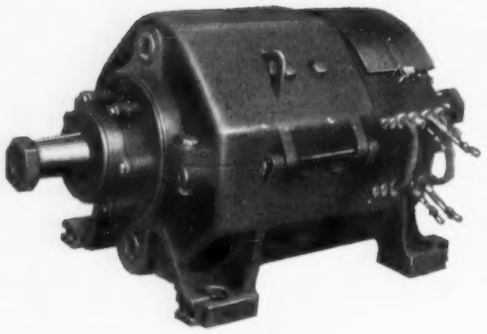
Tin Improves Strength

A distinctive feature of the alloy is the inclusion of tin in its composition. Through laboratory and practical tests, it has been found that tin exerts a peculiar effect of increasing the tensile strength and the ductility of the alloy simultaneously, and that in addition the tin exerts a pronounced influence on the resistance of the alloy to corrosive action.

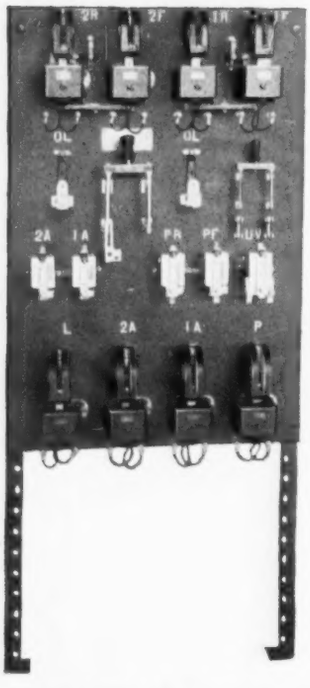
Herculoy is available in the form of sheets and plates; rolls and strips; rods, bars and shafting; die pressed or hammered forgings; rivets; welding rods; and in ingot form for sand castings. It is welded readily with filler rod of the same composition and the resulting bond is claimed to be uniform throughout, insuring freedom from selective or electrolytic corrosion.

TYPE MD MOTORS
TYPE MT CONTROL

Six Years' Service in the Nation's Steel Mills



Type MD-400 motor



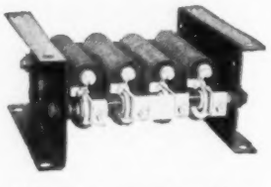
Type MT standard reversing panel

THOUSANDS of these motors and controllers are in service in steel mills, large and small, doing the toughest jobs with a record for capability and reliability that has earned the supreme confidence of their users.

Type MD-400 motor is designed to meet the dimension and rating specifications of the A.I. & S.E.E. It is strong, simple, conservatively rated, and is capable of standing the gaff of the severest service on your mill auxiliaries and cranes.

Type MT control is as dependable and efficient as its companion, the MD motor. It is particularly recommended for drives requiring fast reversing and fast accelerating to full or partial speed. It not only protects the motor against burn-outs, but also the driven machine against careless or inexperienced operators.

Your operating department should have complete information on this thoroughly modern motor and its companion control. Your nearest G-E office will be glad to send you copies of publications GEA-714B and GEA-1290, and to answer any further questions. General Electric Company, Schenectady, N. Y.

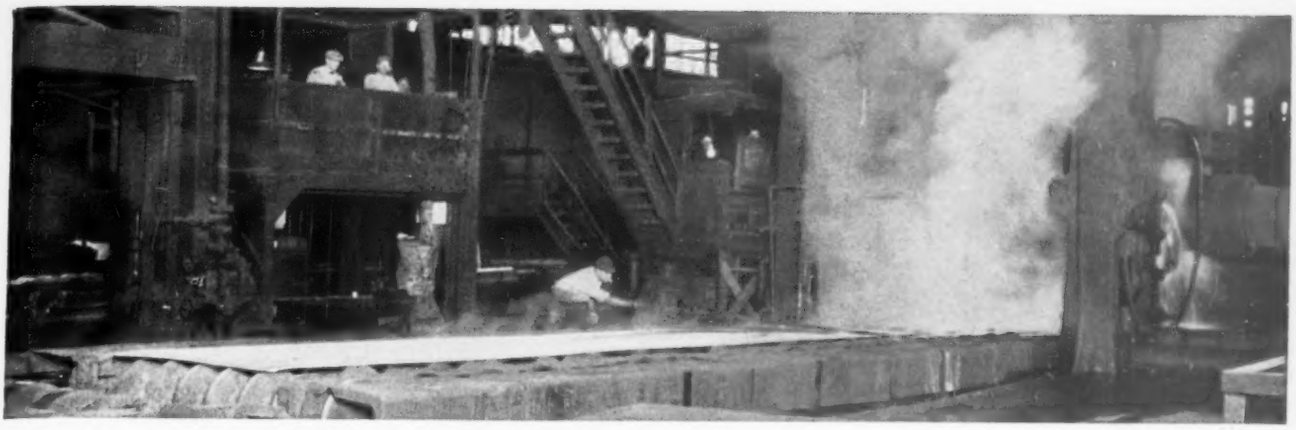


Edgewise-wound resistor

Cam-type master switch

237-57

GENERAL ELECTRIC



PROGRESS IN STEELMAKING

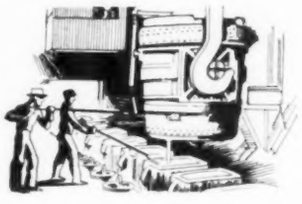
RUSTLESS steel prior to forging should be given a thorough preheating in a controlled furnace separate from the forging furnace, according to tests conducted at a western forge plant. Rapid heating of the work in the forging furnace and during reheats is essential for the production of sound alloy forgings. A definite limit between the preheating and forging temperature is controlled by maintaining the temperature of the preheat under the carbon precipitation range for steels containing nickel. For steels containing chromium, the temperature of the preheat should be held below the point of grain growth.

♦ ♦ ♦

Metallic recuperators employed by a steelmaker in the Chicago district for heating blast furnace gas to 900 degrees Fahr. prior to firing in a continuous slab heating furnace, has effected a large reduction in fuel costs.

♦ ♦ ♦

Metasilicate of soda is considered by many picklers of steel to be the most efficient grease remover because of its ability to give an emulsion of oil surrounded by films of water and to prevent the formation of an oil skum at the top of the bath. Work fed into an oil-skummed pickling bath becomes contaminated and will not take a uniform coating.



COATING the interior surface of ingot molds with graphite having lubricating qualities prevents the splashings from adhering to the walls during the pouring operation, thus obviating scab formation.

♦ ♦ ♦

One of the latest improvements in tiering trucks for handling and piling sheets, plates and coiled strip is an adjustable shifting device on the fork carriage. This development permits the commodity being handled to be moved sidewise approximately 4 inches and facilitates piling the load on the shipping floor or in the warehouse.

ACCURATE control of the time cycle of and the temperature and atmosphere within electric annealing furnaces affords the annealing of high-carbon strip to the desired temper without any semblance of decarburization, according to practice at one plant.

♦ ♦ ♦

Applying the larger part of the heat input to the top third of galvanizing pots, less in the middle and only a small portion at the bottom of the kettle results in prolonging the pot life and in a drastic reduction of dross loss, according to an authority on galvanizing practice.

♦ ♦ ♦

An open-hearth operator reports that where it is desirable to adapt a producer-gas furnace to oil firing, an efficient furnace can be built merely by changing the design above floor level, still retaining the double-slag pocket and three uptake features. The changeover consists in removing the gas ports and installing an arch across the top of the gas uptake. A small port with a water-cooled nose is built on top of this arch to house the oil burner. Adequate openings are made in the division wall for necessary heat distribution to all regenerators and slag pockets. The roof knuckle is raised to 6½ inches below the roof without any change being made in the end roof over the ports and uptakes.

♦ ♦ ♦

Unusual combination of properties for nitriding are claimed for a recently developed alloy steel containing from 0.50 to 2.50 per cent chromium, 0.30 to 2.00 per cent vanadium and from a low percentage up to 0.70 per cent carbon.

♦ ♦ ♦

Fluctuations in the thickness of strip or wire during reduction are indicated by a recently devised gage which obviates the necessity of stopping the rolls to inspect the material. The stock in the process of rolling passes between a gaging anvil and a gaging contact pointer. The latter forms one end of a lever that is hinged in the center and that is made to contact with the product by spring pressure. The other end of the lever is kept in contact with the armature lever of the gage head. Any variation in the thickness of the stock is transmitted mechanically to the gage, magnified through an electric circuit and shown on an indicating dial. If permanent records are desired the unit is provided with a recorder which is actuated by a photoelectric tube.

WASHED producer gas is used by a sheetmaker in the Detroit district for deoxidizing sheets following the annealing operation.

Scanning the Field of Technology

A Digest of Important Developments Pertaining to the Production, Processing, Application and Performance of Steel

Turbulent Firing of Blast Furnace Gas

By Otto de Lorenzi, in Blast Furnace and Steel Plant, June 1932, p. 523, first installment, 4 pp., 4 illusts.

Proper application of turbulence to the problems encountered in the combustion of "lean" fuels has produced some remarkable performance records. Of major importance have been the results obtained when burning washed blast furnace gas in the bare tube type of water cooled furnace. This fuel is most difficult to ignite and burn quickly in an all-refractory furnace, and because of this characteristic, much resistance was encountered when the all-water-cooled type of furnace was suggested as a means for effecting operating economies. It was felt that it would be impossible to keep the gas burning in a cold wall type of furnace. This apparent fuel fault was in reality omission in burner and furnace design, the essential feature necessary being sustained turbulence.

In the design for turbulent or corner firing the burners are placed in the four corners of the furnace. Fuel gas and air streams, issuing from them at high velocity, are directed along tangents to an imaginary horizontal circle, in the center of the furnace. Velocity of the gas and air is sufficient to impart a rotary motion to the mixture in the furnace, and in this manner turbulence is not only secured at the burners, but is sustained until the combustion process is practically completed.

—STEEL, 6-27-32

Factors Which Affect Production of Good Forgings

By Adam M. Steever, in Metal Progress, June 1932, p. 50, 5 pp., 4 illusts., 1 table.

Important considerations which make for strong, tough and satisfactory forginge are (1) correct heating practice and (2) control of grain flow. By correct heating practice is meant sufficient time at the correct temperature to heat the stock uniformly to the center. Heating before forging is controlled by seven metallurgical factors: Rate of heating; time at heat; maximum permissible temperature to avoid burning the material; maximum forging temperatures; decarburization of the surface; scaling; and finishing forging temperatures.

In order to secure maximum strength and durability, especially against shock and high stresses, forgings should be so formed that the flow lines are in the correct position. Forgings possess a distinctive direction of flow of their component crystals. Since the first essential in a forging is that it should not fail in service, it is important that stress should be carried in such a direction in the metal as will be most resistant to failure.

—STEEL, 6-27-32

Preparation of Work For Cylindrical Grinding

Second of a series of two articles describing preparatory methods necessary in insuring accuracy in production grinding, Abrasive Industry, July 1932, p. 19, 2 pp., 3 illusts.

Preparation of work for cylindrical grinding has much to do with the accuracy of finished parts. This includes centering ends of the stock and providing some means for driving the piece—either drilling for driving pins or milling a slot across the diameter. Finishing allowances are important; if too small, the pieces will not grind out, and if too great, unnecessary time is consumed in bringing parts to size.

Attention should be given to the centers in the work if accurate results are expected. General use of combination drills and countersinks automatically insures the correct 60-degree countersink angle. Where heavy lathe cuts are taken preparatory to grinding, the strain put on the centers sometimes wears them out of shape. Thus it is good practice to re-center such work before it goes to the grinder.

—STEEL, 6-27-32

Bluing and Browning Steel Articles

Reference book sheets, American Machinist, May 19, 1932, p. 659, 2 pp., no illusts.

In a niter bath a peacock blue or temper blue can be obtained consistently on steel articles by cleaning them, giving them a thin coating of oil and then immersing in the hot niter at 600 to 650 degrees Fahr. The parts are held in the niter for a few minutes, then raised to note the depth of coloring attained, replacing in the molten salt until they reach the desired color. Time required varies with temperature and size of pieces, but is never over 4 or 5 minutes. After the proper color is obtained the articles are quenched in cold, clean water to strike the color, then immersed in boiling water and finally in hot oil.

Among other coloring methods for finished work may be mentioned oil blackening, which gives a dull finish; cyanide mottling, which gives a highly colored and mottled surface; and drawing to color in a sand bath, yielding a range of color from straw to purple. Parkerizing and other phosphatic coatings of iron and steel yield excellent finishes.

Many processes are available for browning steel. In general the browning solution is applied evenly over the surface with a brush, sponge or by dipping. The article is then kept for a certain time in a room or cabinet where good conditions for rusting are maintained. It is then boiled in water to reduce ferric oxide to magnetic oxide, and finally the article is carded to remove any loose particles of oxide on the surface. Careful control of temperature is essential.

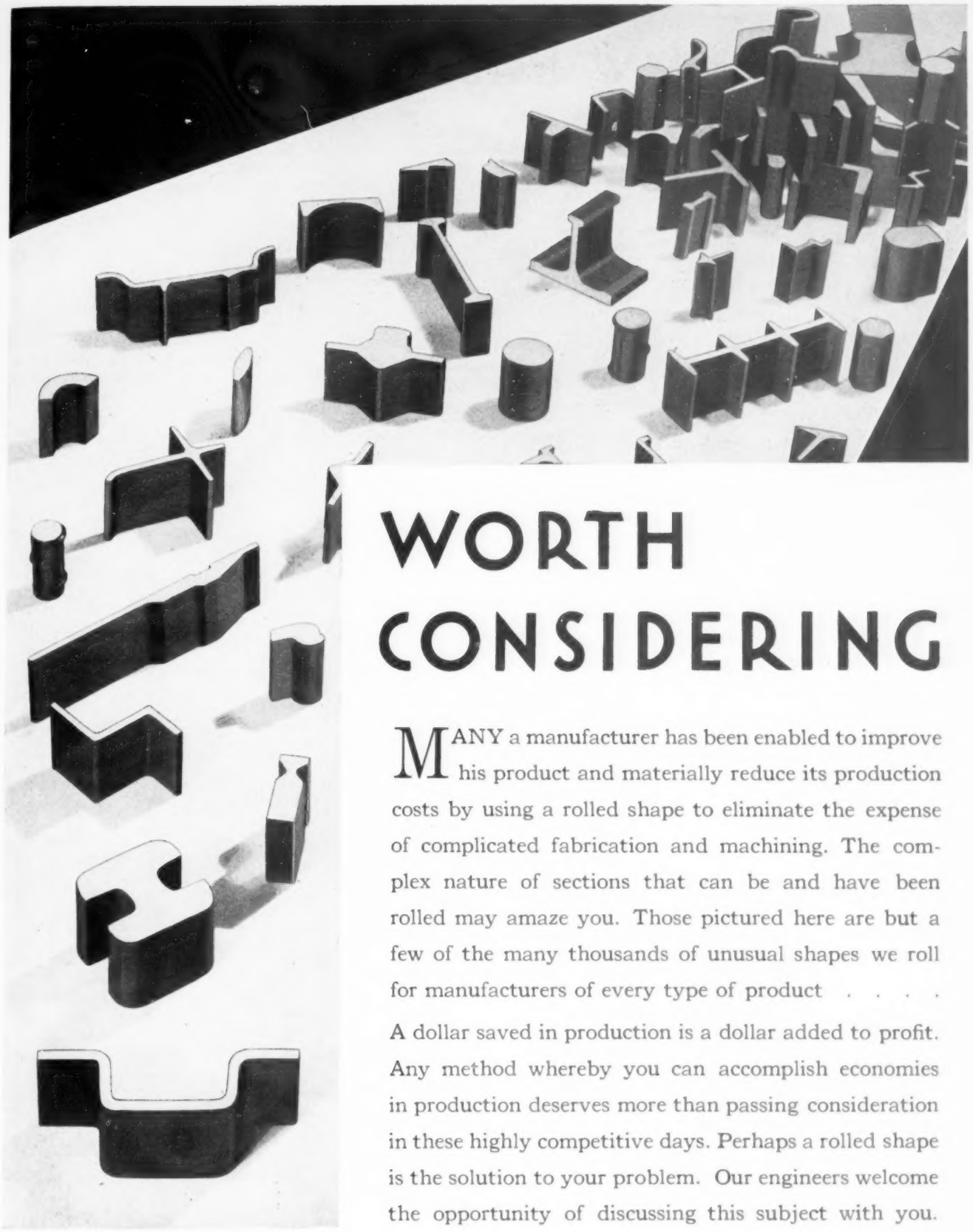
—STEEL, 6-27-32

Reducing Wear by Hardfacing Proves Economical

Oxy-Acetylene Tips, June 1932, p. 83, 5 pp., 7 illusts.

Hardfacing by means of the oxyacetylene process is standard practice in a large number of plants in a wide variety of industries. There are still, however, innumerable applications for this process, which have not been developed to their fullest extent. Whenever abrasion is encountered in industry, the life of that part subjected to excessive wear is shortened to less than that of the rest of the machine. Shutdowns, repairs or replacements are the inevitable result. Valuable production time is lost while the equipment stands idle, but overhead expenses do not cease. Hardsurfacing those members receiving the greatest abrasive action materially increases their life. Fewer spare parts are necessary; idle machine time is decreased; production costs frequently are lowered; and greater overall efficiency is maintained.

—STEEL, 6-27-32



WORTH CONSIDERING

MANY a manufacturer has been enabled to improve his product and materially reduce its production costs by using a rolled shape to eliminate the expense of complicated fabrication and machining. The complex nature of sections that can be and have been rolled may amaze you. Those pictured here are but a few of the many thousands of unusual shapes we roll for manufacturers of every type of product . . . .

A dollar saved in production is a dollar added to profit. Any method whereby you can accomplish economies in production deserves more than passing consideration in these highly competitive days. Perhaps a rolled shape is the solution to your problem. Our engineers welcome the opportunity of discussing this subject with you.

CARNEGIE STEEL COMPANY · PITTSBURGH

Subsidiary of United States Steel Corporation

180

NEW EQUIPMENT

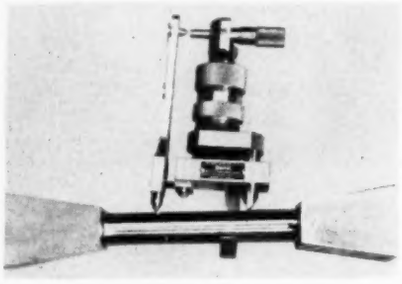
PRODUCTION FABRICATION TREATMENT FINISHING

Drilling Machine Equipped With Ninety Spindles

Foote-Burt Co., Cleveland, just has developed a special 5-way multiple spindle drilling machine equipped with a total of 90 spindles for drilling a V-type cylinder block. As shown in the accompanying illustration the unit has one vertical head, two upper angular heads and two lower angular heads. It is of unit type construction, each drilling unit being complete within itself with individual motor drive.

Heads are driven by the latest drum type cam units, the vertical unit and two upper angular units having 14-inch diameter cams and the two lower angular units having 10-inch diameter cams. It will be noted that all units are driven by standard foot mounted motors so that the motors may be interchangeable, whether they are used on vertical, horizontal or angular ways. All heads and cam units have individual lubricating systems with sight feed gage to show the level of oil in the unit.

Work that must be performed by the operator is extremely simple; that is one throw-in lever operates all drilling units. Due to the newly developed throw-in mechanism of the cam units, this lever works easily. The throw-in lever starts the cycle of all units simultaneously and each unit continues through its cycle, returning to the starting point and remaining until the machine is unloaded and reloaded, and the throw-in lever again operated.



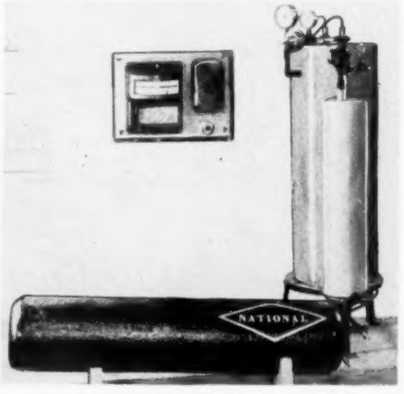
Application of extensometer announced by Linde Air Products Co.

◆

Extensometer Determines Yield Point of Specimens

Linde Air Products Co., 30 East Forty-second street, New York, has placed on the market an extensometer, a new testing device which makes it possible to determine the yield point of specimens being tested in the company's portable tensile testing machine. Sensitivity of the unit is such that it will indicate the elongation in a standard A.S.T.M. test specimen occasioned by the heat of the human hand.

Although highly sensitive, this precision instrument, shown at left, is simple, rugged, self-contained and self-compensating. The two points of the extensometer are clamped on the specimen to be tested in such a manner that the elongation between the two points during tension is multiplied in a ratio of 5 to 1 by a lever bar making electrical contact with the micrometer head. Movement of contact is indicated by the flash of a small electric light in the extensometer head. This exclusive feature makes it possible for a single operator using the portable tensile testing machine in combination with the extensometer to determine both the ultimate strength and the yield point of the specimen.



Electric ammonia dissociator developed by Ajax Electric Co.

FOOTE-BURT five-way drilling machine equipped for drilling a V-type cylinder block. Heads are adjustable individually on the ways to compensate for drill grinding, adjustment being accomplished by means of a crank which is used on squared shafts that are placed within easy reach of the operator

◆

Electric Ammonia Dissociator Produces Pure Gases

Ajax Electric Co. Inc., Frankford avenue and Allen street, Philadelphia, has developed an electric ammonia dissociator. This method of producing hydrogen and nitrogen by "cracking" or dissociating anhydrous ammonia now offers industry a cheap and reliable source for obtaining these gases in an extremely pure state.

The apparatus, shown in the accompanying illustration, yields a dry gas containing 75 per cent hydrogen and 25 per cent nitrogen. Due

to the purity of the raw material (anhydrous ammonia) the gas produced is not contaminated with any hydrocarbons, oxygen, oil or sulphur. A standard cylinder of 100 pounds of ammonia will yield 4500 cubic feet of dissociated gas. The Ajax company is offering these electric ammonia dissociators in standard sizes of 50, 150, 300 and 500 cubic feet per hour capacity.

◆

Universal Milling Machine Employs New Principle

Sleeper & Hartley Inc., Worcester, Mass., has placed on the market a vertical spindle milling machine which is a distinct departure from the usual type, operating on an entirely new principle. As the name implies, the universal milling unit is entirely universal in its operation in that it is capable of finishing five surfaces of work without changing the position of the piece on the table.

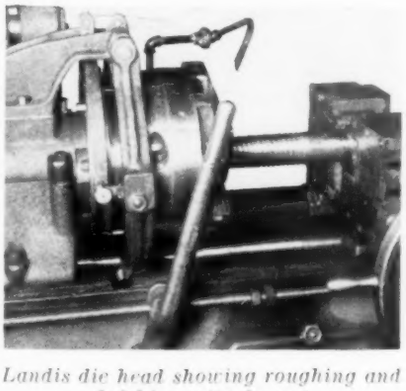
All feeds on this machine are motorized, two motors providing ample power. The traveling head may be fed in any direction with a wide choice of speeds. The traverse operates in either direction and is interlocking with the vertical feed. Since it may also be operated independent of the longitudinal feed, it is possible to cross-traverse or cross-feed while the head travels lengthwise of the table.

The cross-rail is also power actuated and once positioned is held in place by a clamping device which can be operated from either side of the machine.

◆

Die Head Has Roughing and Finishing Attachment

Landis Machine Co. Inc., Waynesboro, Pa., has introduced a new die head having a capacity up to and including 4-inch diameter and equipped with a roughing and finishing attachment for use on the Landis 4-inch leadscrew threading machine. The die head, shown herewith, is recommended for cutting coarse pitch threads on valve stems, vice screws, jack screws and similar classes of work which require accuracy and a smooth finish.



Landis die head showing roughing and finishing attachment

Roughing and finishing cuts are controlled by a latch mounted on the yoke bracket. Release of the latch, after the roughing cut is made, permits the die head to close for a light finishing cut. The amount of metal removed during this cut is approximately 0.045-inch. No cutting strains are transmitted either to the die head yoke or the roughing and finishing attachment.

◆

Press Brake Performs Rapid Forming Operations

Dreis & Krump Mfg. Co., Seventy-Fourth street and Loomis boulevard, Chicago, has placed on the market a new press brake, shown in the accompanying illustration. The unit is adaptable for rapid forming of sheet metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, store fixtures and a large variety of sheet metal specialties.

Universal milling machine introduced by Sleeper & Hartley Inc.

Constructed of steel throughout, the bed of the unit is fabricated of two plates spaced $\frac{3}{4}$-inch apart, permitting punchings to drop through to the floor. A single plate friction clutch is built integral with the flywheel and is operated by a foot treadle. The brake works automatically with the clutch.

The ram can be stopped at any point of up or down stroke by releasing the treadle. Adjustment for various heights of dies is provided by large set screws at each end, which raise or lower the bed to the desired height.

Press brake placed on the market by Dreis & Krump Mfg. Co.

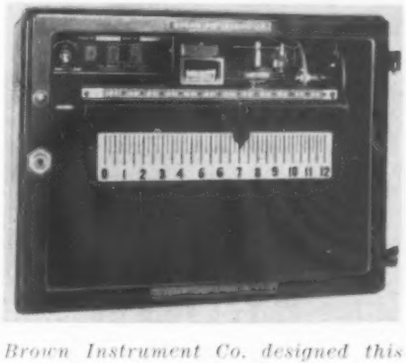
◆

Indicating Potentiometer Is Self-Balancing

Brown Instrument Co., Philadelphia, recently developed a new indicating potentiometer of the self-balancing type as the latest addition to its instrument line.

Aside from this primary design feature, the new unit offers many other outstanding advantages. Among these are an unusually long (40-inch) slide wire, positive spiral shaft drive and a nonslip clutch.

A feature indicated in the accompanying illustration, is the large scale with large figures, calibration marks and pointer, making accurate reading easy at a considerable distance. As a pyrometer this instrument can be supplied for any range from 0 to 100 degrees Fahr. up to 0 to 3,000 degrees Fahr., or for almost any span between these ranges. Models for automatically controlling as well as indicating temperatures can be furnished where specified.



Brown Instrument Co. designed this indicating potentiometer

Crimping

Crimping is a common and relatively simple fabricating operation, yet even here there's a big difference in the results when Youngstown Sheets are used.

At the right a sheet metal worker is crimping the end of a length of furnace pipe—and he will tell you that it is an easier operation, and makes a better job, when Youngstown Sheets are used.

YOUNGSTOWN SHEETS

Each type of Youngstown Sheet is made with one primary goal - to be exactly adapted to actual shop-conditions in its later fabrication.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices: YOUNGSTOWN, OHIO

One of the oldest manufacturers of copper-steel, under the well-known and established trade name "Copperoid"

YOUNGSTOWN

SHEETS FOR EVERY PURPOSE .. INCLUDING YOURS

Shape Rollings Hold Steelmaking Rate at 17

Large Producers Warring on Price Concessions—Tin Plate Production Is Strong—May Exports Sharply Up as Japan Takes Scrap

A BUNCHING of rollings—chiefly structural material for public work—by Carnegie Steel Co. mills in the Pittsburgh district lifted production in that district four points to 20 per cent last week and staved off the threat of the national steelmaking rate to break through 17 per cent.

This improvement at Pittsburgh, part of which will be surrendered this week, offset slight reductions in the Chicago, eastern Pennsylvania, Youngstown and Buffalo districts. A three-point rise at Buffalo this week may continue the 17 per cent rate into the fourth consecutive week, but a general shrinkage in bookings last week makes the task difficult.

Price appears more of a factor in the markets. Contrasted with pig iron, scrap and other raw material, finished steel quotations have been comparatively stable, but subsurface conditions, particularly aggravating to the larger producers, are now boiling up.

For specific business, some small makers have been offering prices which the large interests have refused to meet. The necessity to keep mills going and raise cash has disturbed, in instances. Large producers appear tiring of "holding the umbrella" and are moving toward both a firmer base price situation and a narrowing of the list of preferential customers.

Spiegeleisen has been reduced $2 per ton, effective July 1, in line with the recent $7 cut in ferromanganese. The proposed $2 advance in semifinished steel for the third quarter has been withdrawn and the $26, Pittsburgh-Youngstown, price on billets and sheet bars extended. Coke by-product prices are firm, due to light production, and the supply of toluol is a little short.

Heating and furnace coke appear attractive at $2 to $2.15, and more consumers are reported stocking. In the East, scrap dealers have bid as low as 22 cents a ton on machine shop turnings, taking a $2.78 rate to the consuming point. At Detroit, dealers have offered 50 cents for a destination taking a $4.13 rate.

Largest prospective business before the industry is the Hoover dam requirement for 52,000 to 60,000 tons of plates for tunnel liners, the Babcock & Wilcox Co., New York, apparently being low on the general contract. The plates probably will be rolled at Chicago.

Tin plate mills at Pittsburgh have stepped production up five points to 55 per cent, on the basis of broader specifications, while Mahoning valley mills hold at 50 per cent. The Gold Dust Corp. is inquiring for 25,000 base boxes.

Structural steel lettings, still dominated by public construction, have continued the declining tendency of the past two weeks, and for the week ended June 25 totaled 10,262 tons, compared with 12,672 tons the week preceding. Largest prospective work is 15,000 to 17,000 tons for the Philadelphia postoffice, to be up in July; 5000 tons for the Minneapolis postoffice, bids June 28; and 5000 tons of piling at Pittsburgh for various federal river projects.

Ford last week placed, among other items, 100,000 sets of straight-chrome headlight shells and several hundred tons of terne plate with Pittsburgh district mills. Chrysler has taken prices but has not yet bought for the third quarter. In the aggregate, automotive requirements for steel are shrinking.

Exports of iron and steel products in May jumped to 80,477 tons, largest since July, 1931, chiefly because shipments of scrap—largely to Japan—increased from 19,047 tons in April to 45,000 tons in May. Iron and steel imports in May were up slightly, to 39,751 tons.

With hot-rolled strip being placed on a 1.45c market for widths up to 24 inches, the finished steel composite of STEEL is up 9 cents to $47.71. Adjustments at Pittsburgh lower the scrap composite 12 cents to $6.46. The iron and steel composite, however, is unchanged at $29.52.

Composite Market Averages

	June 25	June 18	One Month Ago May, 1932	Three Month Ago March, 1932	One Year Ago June, 1931	Ten Years Ago June, 1922
Iron and Steel Composite	$29.52	$29.52	$29.62	$29.61	$31.02	$36.96
Finished Steel Composite	47.71	47.62	47.62	47.09	48.60	53.29
Steelworks Scrap Composite	6.46	6.58	7.03	7.94	8.84	14.60

Iron and Steel Composite:—Pig iron billets, slabs, sheet bars, wire rods, pipe, tin plate, nails, sheets, plates, shapes, bars. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Melting steel, compressed sheets.

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	June 25, 1932	May 1932	March 1932	June 1931
PIG IRON				
Bessemer, del., Pittsburgh	$15.76	16.13	16.76	18.26
Basic, valley	14.00	15.00	15.00	17.00
Basic, eastern del., eastern Pa.	14.50	15.00	15.75	17.00
No. 2 foundry, del. Pittsburgh	15.76	16.16	16.51	18.26
No. 2 foundry, Chicago	16.00	15.60	16.50	17.50
*Southern No. 2, Birmingham	11.00	11.00	11.00	12.00
**No. 2X, Virginia furnace	18.00	18.00	18.00	18.25
**No. 2X, Eastern del. Phila.	14.76	15.13	15.76	17.76
Malleable, valley	14.50	15.00	15.50	17.00
Malleable, Chicago	16.00	15.60	16.50	17.50
Lake Superior, charcoal, del. Chi.	23.04	23.04	23.04	27.04
Gray forge, del. Pittsburgh	15.63	15.63	16.13	17.63
Ferromanganese, del. Pittsburgh	73.24	80.24	80.24	89.79

*1.75-2.25 silicon. For local delivery. Northern shipments based on $10, Birmingham. **2.25-2.75 silicon.

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c per gross ton, beginning Jan. 4, 1932.

COKE				
Connellsville, furnace, ovens	2.00	2.15	2.25	2.40
Connellsville foundry, ovens	3.00	3.15	3.25	3.25
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	29.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	29.00
Billets, open-hearth, Pittsburgh	26.00	27.00	27.00	29.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00

	June 25, 1932	May 1932	March 1932	June 1931
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.60	1.60	1.55	1.65
Steel bars, Chicago	1.70	1.70	1.70	1.70
Steel bars, Philadelphia	1.91	1.91	1.81	1.94
Iron bars, Chicago	1.65	1.65	1.70	1.70
Shapes, Pittsburgh	1.60	1.60	1.55	1.65
Shapes, Philadelphia	1.75	1.75	1.66	1.76
Shapes, Chicago	1.70	1.70	1.70	1.70
Tank plates, Pittsburgh	1.60	1.60	1.55	1.65
Tank plates, Philadelphia	1.79½	1.79½	1.69½	1.85½
Tank plates, Chicago	1.70	1.70	1.70	1.70
Sheets, No. 10 blue anneal., Pitts.	1.70	1.70	1.70	1.85
†Sheets, No. 24, hot, ann., Pitts.	2.20	2.20	2.20	2.15
Sheets, No. 24, galvan., Pitts.	2.85	2.85	2.80	2.80
Sheets, No. 10 blue anneal., Chi.	1.85	1.85	1.85	2.00
†Sheets, No. 24, hot ann., Chi.	2.35	2.35	2.35	2.40
Sheets, No. 24 galvan., Chi.	3.00	3.00	3.00	2.95
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Wire nails, Pittsburgh	1.95	1.95	1.95	1.80
Tin plate, per base box, Pitts.	4.75	4.75	4.75	5.00

†Comparisons are with old classification No. 24 black sheets.

SCRAP				
Heavy melting steel, Pitts.	$8.75	9.75	10.25	10.30
Heavy melting steel, eastern Pa.	6.25	6.25	7.35	8.75
Heavy melting steel, Chicago	5.50	6.20	6.75	8.50
No. 1 wrought, eastern Pa.	6.25	7.75	9.00	10.50
No. 1 wrought, Chicago	4.75	5.25	6.25	8.25
Rails for rolling, Chicago	7.50	8.25	9.50	10.90

Sheets

Ford Allocates Some Orders—Miscellaneous Lines Slow—Renew Efforts to Stabilize Prices

SHEET PRICES, PAGE 45

Pittsburgh—Were it not for last week's specifications from the Ford Motor Co. for July shipment, it is likely that sheet mill operations would have fallen to a new low point. The Ford company's purchase of body sheets for July was allocated June 23, several local interests participating. Little change is noted in specifications from other consumers, and no improvement is in early prospect. Galvanized sheets, at 2.85c, appear to be the firmest. Efforts are being made to stabilize other grades, through the elimination of concessions. Black sheets are 2.20c and blue annealed, 1.70c.

New York—Some sellers have not formally announced third quarter prices for full-finished sheets, but are likely to take action similar to others who have reaffirmed current quotations. Present prices on ordinary grades have been generally adopted for third quarter. With building construction light, sheet buying remains restricted.

Youngstown, O. — Independent sheet mill activity continue to be regulated to demand. The custom in June always has been to follow diminishing consumer requirements by tapering mill operations. Some interest is noted in the wage conference between mill representatives and the Amalgamated Association of Iron, Steel and Tin Workers in Pittsburgh. Meanwhile, specifications from important consumers, such as automobile builders, are dwindling. As sheetmakers do not seem inclined to advance their quotations for third quarter, they evidently do not anticipate an increase in sheet bars.

Philadelphia—The sheet market is featured by slightly increased buying by jobbers and range boiler manufactures. Prices are unchanged.

Cleveland—The $1 to $2 per ton reduction in pickling extras on hot rolled and hot-rolled annealed sheets, as announced in STEEL last week, has not had an appreciable effect on business, as in the experience of representative mills only about 20 per cent of the sheets in these classifications are pickled. The sheet market in general manifests little change. Some inquiries have been received from automobile partsmakers, though buying by the automotive industry is light. Some inquiries also have been issued by stovemakers. Small buyers continue to place a fair volume of electrical sheets. With few exceptions, prices are steady.

Cincinnati—Demand for sheets has receded slightly, with the close of seasonal ordering in several lines of manufacture.

Bids recently were taken on 199 tons of pickled and oiled sheets, 0.025-inch thick, for Mare Island, Calif., navy yard, the schedule calling for 17,775 sheets, 25 x 100, 38 x 96 and 32 x 96 inches. Weirton Steel Co., Weirton, W. Va., was ambiguously reported as bidding "$12,270.60 f.o.b." The bid was f.o.b. mill, Weirton, W. Va., not delivered. Newport Rolling Mill Co., Newport, Ky., bid was low at $14,655, delivered, Mare Island.

Chicago—Sheet specifications have declined further, and mill operations are lower at 10 to 15 per cent. Requirements of practically all the larger consumers are in the smallest volume for the year to date. Prices are being continued on the basis of recent levels.

St. Louis—About the best that can be said of the sheet market is that prices appear to be holding. New buying is restricted to small lots.

Birmingham, Ala.—Sheet production is at the lowest point since modern mills were established here. Mill managers will make no predictions as to when improvement may be expected.

Current Finished Steel Prices

Delivered prices subject to freight surcharge corrected to nearest ½c. Asterisk denotes price change this week

Steel Sheets

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.55c
Gary, Ind. Harbor, base	1.65c
Chicago, del.	1.70c
New York, del.	1.90c
Birmingham, base	1.70c
Philadelphia, del.	1.86c

BLUE ANNEALED NO. 9-10

Pittsburgh, base	1.70c
Chicago, district mills	1.80c
Chicago, delivered	1.85c
Philadelphia, del.	2.01c
New York, del.	2.05c
St. Louis, delivered	2.07½c
Birmingham	1.85c
San Francisco c.i.f.	2.32½c

HOT ROLLED ANNEALED NO. 24

Pittsburgh, base	2.20c
Gary, Ind. Harbor, base	2.30c
Chicago, del.	2.35c
New York, del.	2.55c
Philadelphia, del.	2.51c
Birmingham, base	2.35c
St. Louis, del.	2.57½c
San Francisco, c.i.f.	2.85c

GALVANIZED NO. 24

Pittsburgh, base	2.85c
Gary, Ind. Harbor, base	2.95c
Chicago, del.	3.00c
Philadelphia, del.	3.16c
Birmingham, base	3.00c
St. Louis, del.	3.22½c
San Francisco, c.i.f	3.50c

AUTOMOBILE NO. 20

Pittsburgh, base	2.80c to 2.90c

FURNITURE

Pitts., No. 10 heavy	2.55c
Pitts., No. 20 light	3.15c

TIN MILL BLACK NO. 28

Pittsburgh, base	2.40c to 2.50c
Gary, base	2.50c to 2.60c
St. Louis, del.	2.77½c to 2.82½c

HEAVY COLD ROLLED NO. 10

Pittsburgh, base	2.25c
Gary, Ind. Harbor, base	2.35c
Chicago, del.	2.40c
Philadelphia, del.	2.56c
New York, del.	2.60c
St. Louis, del.	2.62½c

COLD ROLLED NO. 20

Pittsburgh, base	2.75c
Gary, Ind. Harbor, base	2.85c
Chicago, del.	2.90c
Philadelphia, del.	3.06c
New York, del.	3.10c
St. Louis, del.	3.12½c

TIN AND TERNE PLATE
Per 100-pound box, Pittsburgh

Tin plate, coke base	$4.75
Long ternes, 24, unassort	3.00c

Gary, Ind., base 10 cents higher

Wire Products

(Prices apply on straight carloads. Mixed and joint carloads take 10 cents higher price; pool carloads 25-cent advance; less carloads 40-cent advance.)
F.o.b. mills, 100 lb. keg

Standard wire nails	$1.95
Cement coated nails	1.95
Galvanized nails	3.95
(Per pound)	
Polished staples	2.50c
Galvanized staples	2.75c
Barbed wire, gal.	2.60c
Annealed fence wire	2.35c
Galvanized wire	2.80c
Woven wire fencing, (9-11 ga.)	$55.00
(12½ ga. and lighter)	$60.00
(To Manufacturing Trade)	
Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Chicago and Anderson, Ind., $1 over Pitts.-Cleve.; Duluth and Worcester, $2 higher; Fairfield, Ala., $3 higher.

Steel Plates

Pittsburgh, base	1.60c
Philadelphia, del.	1.79½c
New York, delivered	1.90c
Boston, delivered	2.02c
Chicago, base	1.70c
Cleveland, del.	1.78½c
Birmingham, Ala., base	1.75c
Coatesville, Pa., base	1.70c
Pacific Coast, c.i.f.	2.00c
St. Louis, del.	1.97½c

Structural Shapes

Pittsburgh, base	1.60c
Philadelphia, del.	1.75c
New York, del.	1.87c
Boston, del.	2.00½c
Chicago, base	1.70c
Cleveland, del.	1.78½c
Lackawanna, N. Y., base	1.70c
Birmingham, Ala., base	1.75c
Pacific Coast, c.i.f.	2.10c
Do., wide flange	2.20c

Bars

SOFT STEEL

Pittsburgh, base	1.60c
Chicago, base	1.70c
Birmingham, Ala., base	1.75c
Lackawanna, N. Y., base	1.70c
Pacific Coast, c.i.f.	2.00c
Cleveland, base	1.65c
Philadelphia, del.	1.91c
New York, del.	1.90c
Boston, del.	2.02c
Pittsburgh, cold finish	1.75c
Pittsburgh, forg. qual.	1.85c
San Francisco, c.i.f.	2.10c

RAIL STEEL

Chicago Heights	1.50c
Eastern mills	1.30c

IRON

Chicago, base	1.65c
New York, delivered	1.85c to 1.95c
Philadelphia, delivered	1.86c to 1.96c
Pittsburgh, refined	2.70c to 4.20c

REINFORCING

Pitts., billet cut lengths	1.75c
Pitts., stock lengths, mill	1.60c
Chi., billet	1.60c to 1.70c
Chi., rail steel	1.45c
Chi., rail steel, road, bridge and culvert	1.45c
Philadelphia, cut lengths	2.06c
Cleveland, cut lengths	1.75c

Cold-Finished Bars, Shafting

Min. 10,000 lbs. of kind and grade

Pittsburgh	1.70c
Chicago, Buff., Cleveland	1.75c
Detroit	1.90c
Eastern Michigan	1.95c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to 6.75 off
Carloads, Chicago dist.	7.00 to 7.50 off

Alloy Steel

Hot Rolled—F.o.b. Mills
Alloy Quality Bars, 2.65c, mill
(Differentials to various classes of consumers)

S.A.E.	Alloy Diff.	4600 .20 to .30 Mo. 1.25-1.75 Ni.	1.05
2000	0.25	5100 .80 - 1.10	
2100	0.55	Cr.	0.45
2300	1.50	51.00 Cr.	
2500	2.25	spring	0.20
3100	0.55	6100 bars	1.20
3200	1.35	6100 Spring	0.95
3300	3.80	Cr., Ni., Van.	1.50
3400	3.20	Carbon Van.	0.95
4100 .15 to .25		9250 (flats)	0.25
Mo.	0.50	9250 (rds.,sq.)	0.50

Strip, Hoops, Bands

*Hot-rolled strip up to 23 15/16 in. wide, Pitts.	1.45c to 1.50c
*Do, Chicago	1.55c to 1.60c
*Cooperage hoop, Pitts.	1.55c to 1.60c
*Do., Chicago	1.65c to 1.70c
Cold-roll, strip, Pitts., Cleve.	2.00c
Worcester, 3 tons over	2.20c

Rivets

Struc., c.l., Pitts.-Cleve.	2.25c
Struc., c.l., Chicago	2.35c
7/16-in. and smaller, Pitts., Chicago, Cleve.	70, 10 and 5 off

Rails, Track Material

Standard rails, mill	$43.00
Relay rails, Pitts., 20 to 45 lbs.	$21.00 to 23.00
50 to 75	18.00 to 20.00
80 to 100	24.00 to 27.00
Light rails, 25-45, mills	$32.00
Light rails, Chicago	$34.00
Angle bars, mills	2.75c
Spikes, railroad, mills	2.60c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.60c
Spikes, boat, barge, Pitts.	2.90c
Track bolts, Chicago	3.50c
Do. standard, jobbers	73 off list
Tie plates, mills	$37.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 75 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list ..... 75 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 75 off
Tire bolts ..... 60 and 10 off
Stove bolts, 77½, 25 and 10 off in pkgs.; 86 off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 75 off

HEXAGON CAP SCREWS

Milled ..... 80-25 off
Upset 1 in. diam. and smaller 80-25-10 off

SQUARE HEAD SET SCREWS

Upset, 1 in. and smaller ..... 75-10-10 off
Headless set screws ..... 75-10 off
Upset, larger than 1 in ..... 75-10 off

Cut Nails, Chain, Piling

Cut nails, c.l. Pittsburgh	$2.50
Do. less carloads, 5 kegs or over	$2.90
Less than 5 kegs	$3.05
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Specifications Growing Less—Third Quarter Prices Show no Change—Auto Needs Reduced

BAR PRICES, PAGE 45

Chicago—Steel bar specifications are declining gradually, principally as a result of lighter requirements of most automotive interests. Buying by Ford partsmakers is steady and specifications from small miscellaneous users also show little change. Demand for rail steel bars and bar iron continues quiet. The market is being continued at 1.70c, Chicago, with rail steel 1.50c and bar iron 1.65c.

New York—Additional producers have reaffirmed 1.60c, Pittsburgh, for third quarter. Apart from little seasonal railroad inquiry, demand is featureless. Bolt and nut manufacturers in particular are specifying slowly. Common iron bars continue at 1.60c to 1.65c, Pittsburgh.

Philadelphia—Steel mills are not soliciting contracts for steel bars for third quarter and not all yet have made definite announcement of their third quarter price. However, it generally is believed by mills that the present 1.60c, base, Pittsburgh, will be continued into third quarter. This is equivalent to 1.91c, base, delivered Philadelphia. The price on bars is the firmest observed for many years. A couple of mills report a slight increase in current bar bookings but this gain is offset by falling off in the bookings of other mills. Jobbers are among the most consistent takers of steel bars.

Pittsburgh—Carbon steel bar buying still is of moderate proportions, but demand for alloy bars appears somewhat easier. Prices are firm at 1.60c and 2.65c, respectively. A local bar mill resumed operations on a better level last week on a grouping of orders.

Youngstown, O.—Steel bar mills here keep getting driblets of common steel bar specifications sufficient to warrant operation of some smaller bar units. Bar demand appears widely distributed among varied lines of customers, no one class taking large tonnage. In line with lessening auto production, alloy steel needs also have declined as measured by production and sales. Bar sales into third quarter appear likely to be made at second quarter prices.

Cleveland—Though orders for commercial steel bars are more numerous than in May, the volume so far in June is practically unchanged from that in the corresponding period last month. Most buyers appear to be restricting each purchase to the narrowest limitation, for immediate consumption, less-carload orders being most frequent. Some mills note an increase recently in tonnage for rolling at mills' convenience.

Tin Plate More Active; Pittsburgh Operations Up

Tin Plate Prices, Page 45

Pittsburgh—An encouraging volume of specifications for tin plate was rather generally received last week, and the average of operations for mills in this district rose about five points to 55 per cent. This rate probably will be continued into this week. The largest interest is running at close to 50 per cent, with five other producers ranging from 40 to 80 per cent. The price of $4.75 per base box is unchanged.

New York—The Gold Dust Corp., New York, is inquiring for approximately 25,000 boxes of tin plate for delivery in the second half.

Youngstown, O.—Tin plate mills continue to operate at about 50 per cent, which is the highest for any department in the iron and steel industry here. It appears $4.75, per base box of 100 pounds, Pittsburgh, will be reaffirmed for delivery in the last half.

Cold-Finished Buying Less; New Price Holds

Cold Finished Prices, Page 45

Pittsburgh—Third quarter contracting is nearly completed in cold-finished steel bars and consumers are practically all reconciled to the new 1.70c minimum base. Present specifications continue their downward trend and point toward a lower volume in July than in June. Orders from the Detroit district are largely confined to one automobile maker.

Plates

Eastern Market Firmer—Some Mills Abolish Preferential List—Vessel Inquiry for 6500 Tons

PLATE PRICES, PAGE 45

Chicago—Plate buying for tank and railroad equipment work is dull and unchanged. Specifications for miscellaneous uses are light and fail to offset the deficiency in consumption by larger users. The 50,000 to 60,000 tons of plates for the Hoover dam are not expected to be placed for a short time. Plates continue 1.70c, Chicago.

Boston—Plate buying is spotty. A Framingham, Mass., boiler shop placed a fair order. Small tank work is light. Car shops are doing little. A Maine shipyard is specifying for a destroyer. The western Massachusetts pipe welding shop has a fair backlog. Prices are steady at 1.70c, Coatesville, Pa.

Philadelphia—From a price standpoint the steel plate market here is in the most satisfactory condition in a long time. Consumers generally are well pleased with the stable condition now prevailing. All makers are observing the present market level, 1.60c, base, Pittsburgh, or 1.70c, base, Coatesville, Pa., the latter equivalent to 1.7935c, delivered Philadelphia. As July approaches, it is strongly indicated that for the first time in years structural fabricators will go into the new quarter with no preferential prices. Oil companies are buying plates more freely. Eastern mills are interested in the outcome of about 2500 tons of plates required for a pipe line in Boston. Eastern shipyards are interested in a tentative inquiry for a ship that would require about 6500 tons of plates and shapes. About 285 tons of plates will be required by the Lancaster Iron Works Inc., Lancaster, Pa., for a dredge pipe for the United States engineer, Philadelphia district.

Pittsburgh—Many projected barge line orders remain to be awarded. Other plate outlets are inconsequential. Considerable interest is centered on the 52,000 to 60,000 tons of plates for the Hoover dam. It is felt that only two eastern plate mills and one midwestern mill can comply with government specifications for size, thickness and length of the plates. The price is firm at 1.60c, Pittsburgh.

Cleveland—Small plate orders are a little more numerous, and there appears to be an undercurrent of

feeling in the market that improvement in tonnage will be noted toward the close of July or early in August. The price is steady at 1.60c, base, Pittsburgh.

Contracts Pending

400 tons, boiler equipment for Los Angeles; bids Aug. 2.

250 tons, 24-inch welded steel pipe, East Bay municipal utility district, Oakland, Calif.; bids June 24.

300 tons, plates and shapes, tenders WISTARIA and ARBUTUS, commissioner of lighthouses, department of commerce, Washington; bids July 7.

Unstated tonnage, locks and dam No. 15, and equipment, Mississippi river, United States engineer, Rock Island, Ill.; bids Aug. 3.

Semifinished Price Advance Is Withdrawn

Semifinished Prices, Page 52

Pittsburgh—The price of $28 for sheet bars, billets and slabs for the third quarter, announced several weeks ago, has been withdrawn by producers. Sales are quiet on the basis of $26, Pittsburgh, which is fairly firm. Unsuccessful efforts to advance finished sheets and strip for third quarter led to the decision to withdraw $28. Forging billets are strong at $33 a ton but without much demand while wire rods are in a similar market at $37.

Philadelphia—Sales of semifinished steel include standard open-hearth rerolling billets at $26, base, Pittsburgh, and forging quality at $32. These prices are equivalent to $31.749, delivered, Philadelphia, for rerollers, and $37.749 for forging billets.

Youngstown, O.—Current sales of sheet bars, billets and slabs are restricted to immediate needs, and reflect midsummer quietness. The advance of $2 per ton announced for third quarter by some makers has not been tested, as no forward interest is noted. Less talk of an increase is heard.

Cleveland—Sheet bars, billets and slabs currently are $26, base Cleveland and Youngstown, O., and as mills in nearby districts are reaffirming prices at this level for third quarter it appears likely that others will follow, despite recent announcement of a $2 per ton advance. The leading merchant producer here continues with three of its 14 open hearths active.

Fort Worth Well Machinery & Supply Co., Fort Worth, Tex., has changed its name to Well Machinery & Supply Co.

Railroads

Nearly All Rail Mills Idle as Carriers Delay Specifications—Track Fastenings Active

TRACK MATERIAL PRICES, PAGE 45

Pittsburgh—In the absence of new buying, steel mills producing railroad supplies experience continued inactivity. Such small orders as are current universally require rush deliveries. It is reported that the local rail mill will not group a rolling before Aug. 1. Interest is centered on structural steel for the New York Central railroad's double track viaduct extension, New York city, which is yet to be closed on by George A. Fuller Co., New York contractor. Light rails generally are $32 with tie plates $37 a ton and spikes 2.60c.

New York—Should the government extend financial relief to railroads for new equipment it is believed much first would be used equipment. Current demand is at a standstill. Norfolk & Western railroad closes on third quarter requirements for steel locomotive tires June 29.

Chicago—Continued quiet in rail purchases has caused suspension of rail mill operations, although releases of track fastenings are in steady volume. No car buying is in early prospect and repair work continues quiet. Purchases of equipment for repair purposes are at a low ebb.

Warehouse Volume Light; Prices Hold Steady

Warehouse Prices, Page 58

New York — Warehouse volume continues light, dullness prevailing in all lines. Prices are influenced by stocks of foreign steel. Most warehouses note little improvement.

Philadelphia—Jobbers report sales show little variation from last month. Average warehouse bookings are at about 55 per cent of those of a year ago. Prices are steady and satisfactory in that they would yield a profit if volume were larger.

Pittsburgh—Following the slight expansion in orders early in June, demand for steel products from warehouse has quieted and the present run of orders is small. All prices are unchanged.

Cleveland—Warehouse billings so far this month are slightly below the volume of the comparable period in May. No special interest appears for any one class of commodities; demand for cold-finished steel has stood up in relation to the sum total a little better than others. Structural shape requirements are off more than the others. Recent adjustments in cold-finished prices have been generally accepted.

Detroit—A little more activity is in sight as some automobile manufacturers are beginning to order dies for 1933 models, but the general level is still largely unchanged from the May rate. Prices are steady.

Cincinnati—Sales of warehouse materials tend lower with advent of the summer season and its building requirements. Prices are steady.

Chicago — New extras on hoops and bands will become effective July 1 in conformance with changes recently announced by mills. Base prices will continue 2.95c for bands and 3.50c for hoops. Sales have declined moderately since early June.

St. Louis—While spotted and irregular, both with reference to commodities and territory, business of iron and steel warehouses is holding its own fairly well, with prices of all standard items well sustained.

Bolt, Nut Buying Gains; Covering Third Quarter

Bolts, Nuts, Rivets Prices, Page 45

Pittsburgh—Improvement in demand for bolts and nuts is at best only casual. Third quarter contracts are coming in regularly and contracting probably will be over within a few days. Jobbers appear to be buying more rush bolt and nut items, which reflects low inventories. Present prices of 75 off for bolts and nuts and 2.25c for large rivets are unchanged.

Cleveland—More makers of nuts, bolts and rivets are extending current prices for third quarter. Demand for nuts and bolts from the three leading automobile builders is holding up, but the market otherwise is quiet. Rivetmakers have reduced duced operations.

Chicago—Occasional increases are noted in specifications for bolts, nuts and rivets, although total business continues at a low rate. Third quarter contracts have been distributed and steadiness is reported in prices of 75 off for bolts and nuts, and 2.35c, Chicago, for large rivets.

Structural Shapes

Awards Shrink for Second Consecutive Week, but Additional Large Public Works Contracts Are Developing—Eastern Market More Active—Shape Prices Are Firmer

STRUCTURAL SHAPE PRICES, PAGE 45

New York—Bids close July 18 on the Shark river bridge, New Jersey, requiring about 1700 tons of shapes, while more than 600 tons for a bridge at Ocean City, N. J., were awarded in the past week. Municipal authorities at Newark, N. J., are agitating for continuance of work on the Pennsylvania railroad station and other projects in that city, requiring about 13,500 tons, but early action depends on financing. New inquiry is lighter, with government work accounting for the bulk of awards and inquiry. Plain shapes are steady at 1.60c, Pittsburgh.

It is reported here, but not confirmed, that 10,000 tons for the department of justice building, Washington, have been awarded to the McClintic-Marshall Corp., Bethlehem, Pa., through the general contractor, George A. Fuller Co., New York.

Boston—Awards and new inquiry for structural steel have slumped. Total awards for the week probably totaled less than 500 tons. Several large projects have been authorized, including the Point of Pines bridge, Lynn, Mass., but the date for bids is indefinite. Plain material prices are steady at 1.70c, eastern mill.

Philadelphia—The structural steel market here shows more life, particularly for lots ranging from 100 to 200 tons each. Plain standard shapes are firm at 1.60c, base, Pittsburgh; or 1.70c, base, eastern mill, equivalent to 1.7495c, delivered, Philadelphia. Wide flange shapes continue 1.70c, base, Bethlehem, Pa., equivalent to 1.8155c, delivered, Philadelphia. Indications are that all structural fabricators for the first time in years will be paying the full market price for shapes beginning July 1.

Pittsburgh — A state bridge at Rochester, Pa., is the largest recent award in this district. A local structural mill experienced an increase in specifications last week due to releases on some government work. For a two-span 375-foot bridge between Westmoreland and Indiana counties, Pa., 503 tons of structural material will be closed on July 8. Contractors bids on down-river projects requiring sheet steel piling have not been ratified, and about 5000 tons of piling is being withheld from award. Plain shapes are 1.60c; and sheet piling, 1.90c.

Cleveland—The majority of structural shape jobs placed during the week were below the 100-ton mark. However, 465 tons for the Valdecker Packing Co.'s plant No. 21, Piqua, O., were awarded to the Fort Pitt Bridge Works Co., Pittsburgh. Republic Structural Iron Works, Cleveland, took 155 tons for the sludge basins of the easterly sewage disposal plant. A smaller tonnage for the westerly sewage plant went to the Fort Pitt company, which also took a small lot for the Pontiac Improvement Co.'s commercial building, Cleveland. Plain shapes still are 1.60c, base, Pittsburgh.

Chicago—The largest active structural project is 5000 tons for the Minneapolis post office, for which bids close within a few days. Public work still predominates in awards and inquiry. Bridge work accounts for the bulk of about 2500 tons placed recently.

Contracts Placed

1400 tons, Beaver river state highway bridge, Rochester, Pa., to American Bridge Co., Pittsburgh.

1160 tons, postoffice and courthouse, Chattanooga, Tenn., to Virginia Bridge & Iron Works, Roanoke, Va., through Ralph Sollitt & Sons, South Bend, Ind., general contractors.

640 tons, bridge, Ocean City, N. J., to American Bridge Co., Pittsburgh.

525 tons, bridge, West Point, Ky., for Illinois Central Railroad, to American Bridge Co., Pittsburgh.

500 tons, Science building, Georgetown university, Washington, to Lehigh Structural Steel Co., Allentown, Pa.

Awards Compared

	Tons
Awards, week ended June 25	**10,262**
Awards, week ended June 18	**12,672**
Awards, week ended June 11	**26,361**
Awards, this week in 1931	**40,140**
Av. weekly awards, 1931....	**34,236**
Av. weekly awards, 1932....	**15,475**
Av. weekly awards, May.....	**17,402**
Awards to date, 1931.....	**964,787**
Awards to date, 1932.....	**402,372**

500 tons, highway bridge, Beckham county, Okla., to the Boardman Co., Oklahoma City, Okla.

465 tons, Valdecker Packing Co.'s plant No. 21, Piqua, O., to Fort Pitt Bridge Works Co., Pittsburgh.

453 tons, postoffice, Meridian, Miss., to Virginia Bridge & Iron Works, Roanoke, Va.

400 tons, postoffice, Lynchburg, Va., to Virginia Bridge & Iron Works, Roanoke, Va.

350 tons, highway bridges, St. Croix and Pierce counties, Wis., to Clinton Bridge Works, Clinton, Iowa.

340 tons, state bridge, Orange county, New York, to American Bridge Co., Pittsburgh.

317 tons, additional for two bridges over Rio Honda and Los Angeles rivers, Los Angeles, to Kyle Steel Construction Co., Los Angeles.

275 tons, farm group, Rockefeller estate, Tarrytown, N. Y., to Belmont Iron Works, Philadelphia.

272 tons, postoffice, Jackson, Mich., to Whitehead & Kales Co., Detroit, through North-Moller Co., Jackson, Mich., general contractor.

240 tons, St. Anastasia school, Teaneck, N. J., to Harris Structural Steel Co., New York; formerly reported as "to unstated interest."

200 tons, stadium, University of New Mexico, Albuquerque, N. M., to Virginia Bridge & Iron Co., Roanoke, Va.

200 tons, building, Sheffield Farms, Union City, N. J., to Selbach-Meyer Co., West New York, N. J.

197 tons, warehouse, Trunz Pork Stores Inc., Brooklyn, N. Y., to Berkshire Structural Steel Co., Brooklyn.

180 tons, bridge, San Luis Obispo county, Calif., to Judson-Pacific Co., San Francisco.

175 tons, chapel, Methodist Episcopal church, Albany, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

170 tons, church and school, Stroudsburg, Pa., to Lehigh Structural Steel Co., Allentown, Pa., through Cuppels Contracting Co., Kingston, Pa.

160 tons, state bridge, Ellsworth—Oakland, Me., to American Bridge Co., Pittsburgh.

160 tons, bridge, Montgomery county, Pa., to McClintic-Marshall Corp., Bethlehem, Pa., through Driscoll Contracting Co.

155 tons, sludge basin, easterly sewage disposal plant, Cleveland, to Republic Structural Iron Works, Cleveland.

150 tons, addition to penitentiary, Gratersford, Pa., to Frank M. Weaver, Lansdale, Pa.

150 tons, postoffice, Miami, Okla., to Des Moines Steel Co., Des Moines, Iowa.

145 tons, bridge, Clinton county, Mo., to Clinton Bridge Works, Clinton, Iowa.

115 tons, bridge, Sturtevant, Wis., for Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh.

108 tons, warehouse, Waldorf Co., Boston, to New England Structural Co., Boston.

100 tons, bridge, Sullivan county, Pa., to Bauman Iron Works, Reading, Pa.

100 tons, Madden dam, Panama canal zone, to Pusey & Jones Co., Wilmington, Del.

100 tons, highway bridge, Monroe, Wis., to Worden-Allen Co., Milwaukee.

100 tons, University of Washington law school, Seattle, to Hoffus Steel & Equipment Co., Seattle.

Contracts Pending

15,000 to 17,000 tons, Thirtieth street postoffice, Philadelphia, expected to be

out for bids in July.

5000 tons, postoffice, Minneapolis; contractor bids June 28 at Washington.

4000 tons, municipal auditorium, St. Louis; contractor bids June 28.

1700 tons, bridge, Shark river, Belmar-Avon, Monmouth county, New Jersey; bids July 18, state highway commission, Trenton. Also, 80 tons of machinery.

1300 tons, bridge for Illinois waterway commission, Chanahon, Ill.; bids July 12.

1212 tons, bridges, Seneca, Ill.; Wisconsin Bridge & Iron Co., North Milwaukee, Wis., low.

950 tons, barracks and buildings, Hamilton Field, Calif.; bids opened.

725 tons, administration and laboratory buildings, National Institute of Health, Washington; Wills, Taylor & Mafera Corp., New York, low, $572,000.

720 tons, bridge for Illinois waterway commission, Marseilles, Ill.; bids July 12.

650 tons, state bridges, New York; bids being taken.

550 tons, Taft junior high school, Washington; Prescott White Corp., New York, low, $342,371.

503 tons, 375-foot two span bridge, Westmoreland-Indiana counties, Pennsylvania; bids close July 8, Pennsylvania department of highways, Harrisburg, Pa. Included, 73 tons reinforcing steel.

490 tons, sheet piling, and 30 tons beams, easterly sewage disposal plant, Cleveland; Lowensohn Construction Co., low, for general contract.

450 tons, postoffice, Glendale, Calif.; bids July 14.

396 tons, bridge, Creek county, Oklahoma, state highway commission, Oklahoma City; bids June 28.

299 tons, bridges, Jefferson county, Oklahoma, state highway commission, Oklahoma City; bids June 28.

200 tons, addition, reformatory, Elmira, N. Y.

175 tons, state house building, Smyrna, Del.; general contract to William Steele & Sons, Philadelphia.

115 tons, bridge, Clear Creek, Yavapai county, Phoenix, Ariz.; bids opened.

110 tons, addition, powerhouse, Braintree, Mass.

100 tons, warehouse for Southern California Gas Co., Los Angeles; plans prepared.

100 tons, postoffice, Monterey, Calif.; bids June 24.

100 tons, postoffice, El Centro, Calif.; Associated Constructors Inc., Los Angeles, low.

100 tons, postoffice, Pachogue, N. Y.; R. W. Erickson, Philadelphia, low on item 1; Major Constructors Inc., New York, item 2.

Unstated, 1500 feet piling, Presque Park., Erie, Pa., bids at Harrisburg, Pa., July 6.

Metal Price Index holds

Washington—Index number of wholesale prices for the week ended June 18 was 63.7, compared with 63.8 for the week ended June 11, states the department of labor. For metals and metal products the index has stood unchanged at 79.9 for three consecutive weeks.

Concrete Bars

Tonnage Pending in New York District Heaviest in Months—2000 Tons to Be Awarded in New Jersey—Shipments for Highway Construction Slightly Heavier

REINFORCING BAR PRICES, PAGE 45

Chicago — Additional reinforcing bar tonnage has been placed for road work in Indiana, and shipments for highway construction are slightly heavier. Except for government projects, new inquiry is almost entirely lacking. Public construction also predominates in awards. Prices are under considerable pressure, generally continuing 1.60c, mills, for billet bars, and 1.45c for rail steel.

Boston—Reinforcing bar awards are small, although slightly more numerous. Prices are irregular, with domestic bars generally 1.60c, Pittsburgh.

New York—General contracts have been awarded for several public projects and pending tonnage is the heaviest in several months. About 500 tons additional is up for New Jersey highways and bridges. Close to 2000 tons now is pending for that state. Demand is centered almost entirely in public work. Several thousand tons are needed for federal buildings at Washington.

Pittsburgh—A state highway letting goes in July 8 at Harrisburg, Pa., for a few bridge and highway jobs that will take some small tonnage of plain steel bars. Eleven reinforced concrete spans are included. A bridge at Annapolis, Md., calls for domestic steel. Mill shipments of reinforcing bars still are comprised largely of small lots, with 1.60c fairly general on stock lengths.

Cleveland—Recent awards and pending jobs requiring concrete bars are small, though fairly numerous. Lowensohn Construction Co., Cleveland, is low for the general contract for the second section of the easterly sewage disposal plant, Cleveland, requiring 295 tons. Deformed or plain bars to fabricators are 1.50c, base, Cleveland.

Birmingham, Ala.—Production of reinforcing concrete bars is being held down, though numerous contracts have been reported recently. Some hope is expressed that demand will improve during the summer.

Awards Compared

	Tons
Awards, week ended June 25	5,601
Awards, week ended June 18	2,310
Awards, week ended June 11	5,891
Awards, this week, 1931	6,670
Av. weekly awards, 1931	6,808
Av. weekly awards, 1932	4,402
Av. weekly awards, May	3,812
Awards, to date, 1931	176,154
Awards to date, 1932	114,454

Contracts Placed

2200 tons, extensible building, Washington, to Rosslyn Steel & Cement Co., through Aronberg, Fried Co., New York.

500 tons, highway, Williamstown, N. J., to Truscon Steel Co., Youngstown, O.

475 tons, Shrewsbury bridge, Seabright, N. J., to Kalman Steel Corp., Chicago, through Seeds & Derham, Philadelphia.

400 tons, Madden dam, Panama canal zone, to Pusey & Jones Co., Wilmington, Del.

350 tons, bridge, Ocean City, N. J., to Kalman Steel Corp., Bethlehem, Pa.

300 tons, grade elimination, state highway contract A-43-63 Cumberland, Md., to Maryland Steel Products Co., Baltimore; Cumberland Contracting Co., general contractor.

285 tons, postoffice, Jackson, Mich., to Concrete Engineering Co., Chicago, through North-Moller Co., Jackson, Mich., general contractor.

250 tons, bridge, Annapolis, Md., to Maryland Steel Products Co., Baltimore.

250 tons, bridge, South river, Annapolis, Md., to Maryland Steel Products Co., Baltimore.

200 tons, loft, Brooklyn, N. Y., to Rawlins Steel Co., New York, through William Ginsberg Co., New York.

200 tons, road work, Indiana, to Calumet Steel Co., Chicago.

135 tons, trestle, Park boulevard, Oakland, Calif.; to unnamed interest.

105 tons, art museum, Seattle, to Pacific Coast Steel Corp., Seattle.

101 tons, infirmary building, Brattleboro, Vt., (bars, 61 tons) to Truscon Steel Co., Youngstown, O.; (shapes, 40 tons) to G. Haarmann & Co. Inc., Holyoke, Mass.; George H. Reed & Co. Inc., Greenfield, Mass., general contractor.

100 tons, health unit, Roxbury (Boston), Mass., to Truscon Steel Co., Youngstown, O.

100 tons, jail addition, Van Nuys, Calif., to South Gate Iron Works, Los Angeles.

Unstated tonnage, Irvington school, Portland, Oreg., to Mercer Steel Co., Portland.

Contracts Pending

385 tons, bridge, Shark river, Belmar-Avon, Monmouth county, New Jersey;

bids July 18.

370 tons, state highway work in Los Angeles county, Calif.; bids July 6.

300 tons, highway, route 26, sections 4A, 5A and RT. S-26, Middlesex county, New Jersey; bids July 11.

295 tons, easterly sewage disposal plant, Cleveland; Lowensohn Construction Co., Cleveland, low for general contract.

225 tons, highway work in Los Angeles county for bureau of public roads, Los Angeles; bids opened.

114 tons, state highway work in San Diego county, Calif.; bids July 6.

113 tons, state bridge near San Simeon, Monterey county, Calif.; bids opened.

Use Brass Machine Parts In Cold Rolling Strip

The United Engineering & Foundry Co., Pittsburgh, is using rolled brass rods as material for machinery parts which come in contact with steel material being handled at high speeds. The rods are used in machines for winding cold finished strip steel and for reel stripper plates. Parts machined from iron and steel castings are replaced by rolled brass. The latter is specified wherever finished strip comes in contact at high speed with fixed parts of machinery.

The smooth finish of rolled brass and its low friction resistance were important qualities determining its selection. This material not only preserves the finish of the steel, but provides longer life for machined parts, it is stated. The brass rod can be installed without machining or finishing, thereby lowering the initial cost of the part compared with cast material.

Plan Oil Burner Show

Directors of the American Oil Burner association, 342 Madison avenue, New York, will meet at Erie, Pa., July 12, following a special conference of manufacturer members July 11, to select a centrally located city for the annual oil burner show and convention to be held in the late winter or early spring of 1933.

Pipe Output 1,179,436 Tons

Washington—Production of cast iron pipe and fittings in the United States, in 1931, amounted to 1,179,436 tons valued at $45,406,096, acording to the census bureau.

Bucyrus-Erie Co. is removing the manufacture of its large excavating units from Evansville, Ind., to Erie, Pa.

Pipe

Pittsburgh Mill Operations Up Slightly — Movement to East Texas Steady—Cast Sales Light

PIPE PRICES, PAGE 58

Chicago—Milwaukee will take bids June 24 on about 4000 tons of large diameter cast pipe. This is the largest inquiry pending, few other active projects requiring lots up to 100 tons. Orders for carloads and less also are declining, and total business is at a low ebb. Producers pin some hope on federal aid to municipalities for an increase in activity.

Boston—Cast pipe buying is less active. Cities and towns have bought for the year, and utilities are doing little. Standard pipe also is dull. The Walworth Mfg. Co., Boston, took several cars of steel and wrought pipe for the Christian Science Publishing Co.'s heating plant.

New York—Cast pipe sales in the New York district are light. Baltimore and Washington have bids on about 1000 tons each. Inquiry is largely for small lots, a good part of the volume being for state projects. A New Jersey utility is reported to have placed 700 tons. Prices continue weak at $22 to $23, foundry.

The G. J. Atwell Foundation Corp., New York, has been awarded contract for the foundation for the new United States government building here, requiring approximately 3000 tons of steel pipe.

Buffalo—The market for pipe is quiet. Angola, Buffalo suburb, has appropriated $30,000 for a water main, extending 6 miles to Lake Erie.

Pittsburgh — Seamless pipe is making the best showing, with movement of material to the east Texas oil field still the most noteworthy. Despite earlier reports of an award of 9000 tons for a pipe line for the Standard Oil Co. of Kansas, the project still is in the formative stage. A local pipe mill was rolling its share of the Irak oil line last week. Therefore, mill operations were up slightly to about 15 per cent for this district.

Birmingham, Ala.—Pipe awards have been few and far between recently, and production is at a low ebb.

One of the larger shops is continuing its method of operating on partial schedule one week and shutting down almost completely the following week. Other shops are reducing production by other plans. Unfilled tonnage practically has disappeared.

Cast Pipe Placed

136 tons, 4, 6 and 8-inch class 150, for federal prison McNeil Island, Wash., to R. D. Wood & Co., Philadelphia.

150 tons, small sizes, Waltham, Mass., to R. D. Wood & Co., Philadelphia.

Cast Pipe Pending

3800 tons, 24 to 36-inch, Milwaukee; bids June 24.

1000 tons, 6-inch and up, Baltimore.

1000 tons, 36 and 48-inch, Washington.

600 tons, 3 to 12-inch Hamilton field, Calif.; bids received.

Steel Pipe Pending

3000 tons, federal building, New York; G. J. Atwell Foundation Corp., New York, general contract.

Spiegeleisen Reduced $2 Per Ton to $25

Ferroalloy Prices, Page 52

New York—Domestic spiegeleisen, 19 to 21 per cent, has been reduced $2 per ton to $25, furnace, for carlots, effective July 1, according to sellers' announcement June 24. The usual quantity differentials will apply on larger tonnages. The reduction is in line with the recent $2 cut in ferromanganese to $68, duty paid, in carlots. All other ferroalloy prices remain unchanged. Specifications are light.

Pittsburgh—Only occasional spot sales of ferromanganese at the new base of $68 are being made, and demand for other ferroalloys still is depressed. Spiegeleisen is down $2 per ton to $25, furnace, for carlots.

Chicago — Ferroalloy shipments are following the downward trend in steelmaking operations. Specifications for ferromanganese and spiegeleisen are at the lowest level of the year. Ferromanganese continues $68, duty paid, while spiegeleisen has been reduced $2 per ton to $25, furnace.

St. Louis Smelting & Refining Co., subsidiary of the National Lead Co., has uncovered a large deposit of pyritic iron ore near Rico, Colo.

Strip

Market Stabilizing on Basis of 1.45c, Pittsburgh—Ford Lamp Order Enlivens Pittsburgh Mill

STRIP PRICES, PAGE 45

Pittsburgh—A district strip mill received an order from the Ford Motor Co. last week for 100,000 sets of chrome steel lamps. To accommodate rush specifications its mills began rolling June 23 and total strip production of the district averaged close to 25 per cent of capacity for the week. Demand for both hot and cold-rolled strip steel lacks volume, but is made up of many small-sized orders. Cold-rolled contracts for third quarter have practically all been returned without much discussion of the 2.00c base. The new strip base of 1.45c to 1.50c still is receiving a fairly good test.

New York—Strip buying is quiet, with 1.45c, Pittsburgh, on hot strip in carlots yet to be tested. Cold-rolled strip is steady at 2.00c, Pittsburgh, at which figure the market has been extended into third quarter.

Philadelphia—Cold-rolled strip steel continues at 2.00c, base, Pittsburgh, while hot-rolled strip is at the recently adopted price of 1.50c, base, Pittsburgh, less $1 a ton for carload buyers. The hot strip price is subject to the new extras which, in the main, increase somewhat the price of the narrow widths. Demand is slow.

Youngstown, O.—Slipping off a little more each week, strip steel specifications continue to lessen the rate of mill operations. Stripmakers, like sheetmakers, seem strongly inclined to ask no higher quotations for hot or cold-rolled for third quarter delivery than in second quarter. Hence the attitude of nonintegrated mills at present seems to indicate no fear that billet prices may be advanced against them for the coming quarter.

Cleveland—Demand for hot and cold-rolled strip is composed almost entirely of small lots and volume is showing a tendency to shrink. It is apparent that 1.45c, base, Pittsburgh, is the most representative price on wide and narrow hot-rolled, with some makers holding to 1.50c, for the smallest orders. However, one mill is shipping hot-rolled at 1.45c even on the smallest lots where they can be shipped with other material to make a carload. Cold-rolled is steady at 2.00c, base, Cleveland.

Chicago—Strip specifications continue spotty and slightly less active. Requirements of miscellaneous users and automotive interests are tending downward. Interest in third quarter tonnage is light, with the market quoted 1.60c, Chicago, for all widths. Cold-rolled strip is fairly steady at 2.00c, Pittsburgh and Cleveland.

Operations at 17 Per Cent; Pittsburgh up, Chicago Down

Pittsburgh—Ingot production last week gained four points to 20 per cent, due to lighting of several batteries of open hearths by the leading producer the middle of the week, so its ingot operations were up to about 22-23 per cent as against nearly half that figure the week before. In all, it had 37 open-hearth furnaces running as last week closed. Second largest producer is at about 18 per cent. Three small independents each are running two open hearths, or at about one-sixth of their capacities. This week may witness some subsiding from the 20 per cent ingot rate, which increase was largely due to a grouping of orders for production. Blast furnace activity is unchanged, four of 38 stacks blowing for United States Steel Corp., three of 12 for Jones & Laughlin and one of two for Pittsburgh Crucible.

Operations, week ended June 25	**17**
Operations, week ended June 18	**17**
Operations, week ended June 11	**17**
Operations, one year ago	**36½**
High for 1932, Feb. 6	**28.5**
Low for 1932—June 11-18-25	**17**

Philadelphia—Eastern steelmaking operations again are moving downward, now averaging 11 to 12 per cent. No improvement is indicated for the immediate future.

Buffalo—Buffalo district operations, slated to decline to 8 per cent in the week ended June 25, rose unexpectedly to 13 because Bethlehem lighted two additional open hearths. This week operations will go at least to 16 per cent and possibly 21. Six open hearths will be active this week, with an almost complete suspension over the July 4 holiday. An unconfirmed report is that the Wickwire Spencer Steel Co. will light several open hearths at its River road plant early in July.

Youngstown, O.—Steelworks operations here sagged one point last week to 21 per cent, with no prospect of change this week. Finishing mill activity has expanded the past few days. A seamless pipe mill has resumed. Twenty-three of 83 open hearths are melting.

Cleveland—Steel ingot production held at 29 per cent during the week ended June 25, and is scheduled at the same rate for the current week. The American Steel & Wire Co. has five open hearth furnaces active, Corrigan, McKinney Steel Co. three and Otis Steel Co. two.

Chicago—Ingot production slumped further last week, averaging about 15 per cent, with no improvement in prospect this week. Blast furnace schedules, however, are unchanged, with eight steelworks stacks active. Rail mill operations have been suspended and schedules of most other finishing mills are moderately lower.

Birmingham, Ala.—A 19 per cent estimate of steelmaking operations here is generous. Tennessee Coal, Iron & Railroad Co. has four open-hearth furnaces on at Fairfield.

Wire Needs Are Smaller As Season Advances

Wire Prices, Page 45

Pittsburgh—Slight advances in specifications for wire for manufacturing about balance an easier situation in merchant products to the rural districts. June specifications are strictly comparable with those of May. Favorable crop reports indicate that by mid-August an improved situation will be felt in merchant wire products. Prices generally are the firmest in many years at $1.95 on nails in carloads and 2.20c for plain wire.

Worcester—Wire demand is dull, being reflected in irregular operations. Prices are firm.

Chicago—Specifications for most wire products are declining gradually. Consumption of manufacturers' wire reflects seasonal influences, while movement of jobbers' products has slowed in some districts. Third quarter contracts are being renewed with prices generally steady at $2 for wire nails in carloads, 2.25c for plain wire, and $38 for wire rods.

Cleveland—Price steadiness is the most encouraging feature in the market for wire and wire products. Volume is small. Shipments of fencing material are holding up well.

Raw Material Prices

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c gross ton, from Jan. 4

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$16.00
Pittsburgh, dist. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.50
Philadelphia, delivered	14.26 to 14.76
Virginia furnace	17.50
Granite City, Ill., fur.	16.50 to 17.50
Buffalo, fur., local del.	16.00
Buff., all-rail, Boston	18.91 to 19.91
Buff., all-rail, Brooklyn	18.90 to 19.40
Buff., all-rail, Newark	17.28 to 17.78
Ala., Bir. fur., local del.	11.00
Ala., Nor. del., Bir. base	10.00
Alabama, del. Chicago	16.01
Alabama, del. St. L.	14.42
Alabama, del. Cincinnati	13.82
Ala., Phila., dock del.	15.00 to 15.25
Ala., Balt., dock del.	15.00
Alabama, New York dock	15.50
Ala., Boston dock del.	15.75 to 16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	13.82
Montreal, delivered	23.00 to 23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	16.50
Buff., all-rail, Brooklyn	19.40 to 19.90
Buffalo, all-rail, Newark	17.78 to 18.28
Buff., all-rail, Boston	19.91 to 20.91
Virginia furnace	18.00
Eastern, del. Phila.	14.76 to 15.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	17.50
Eastern, del. Phila	15.26 to 15.76

MALLEABLE

Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.50
Pittsburgh dis. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Chicago, furnace	16.00
Buffalo fur., local del.	16.50
Eastern Penna., delivered	16.13 to 19.41
Granite City, Ill., fur.	16.50 to 17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	14.50 to 15.00
Pittsburgh, delivered	15.13 to 16.13
Eastern Penn., del.	14.50 to 15.00
Buffalo fur., local del.	15.50 to 16.00
Montreal, delivered	23.50
Valley, furnace	14.00

BESSEMER

Valley furnace	14.50 to 15.00
Pittsburgh, furnace	15.00
Pittsburgh, delivered	15.63 to 16.13

LOW PHOS.

Valley fur., standard	25.00
Philadelphia, standard	23.76 to 26.79
Copper-bear., E. Pa. fur.	21.50 to 23.00

GRAY FORGE

Valley furnace	14.00
Pittsburgh district fur.	15.00
Pittsburgh, delivered	15.63 to 16.13

CHARCOAL

Lake Superior, del. Chicago	23.04

SILVERY

Jackson County, O., fur. in per cents: 6—$18; 7—$18.50; 8—$18.75; 9—$19; 10—$19.50; 11—$20; 12—$20.50; 13—$21.50; 14—$22.50; 15—$23; 16—$24; 17—$25.50.

Pittsburgh and Buffalo furnace: 7 to 10—$19.50; 15—$23 to $24.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents: 10—$20.50; 11—$21; 12—$21.50; 13—$22.50; 14—$23.50; 15—$24; 16—$25; 17—$26.50.

Coke

Prices Per Net Ton

Beehive Ovens

Connellsville furnace	$2.00 to 2.25
Connellsville foundry	3.00 to 4.25
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	8.21 to 8.81
Chicago, ovens	7.00
New England, del.	10.00
St. Louis, del.	7.75
Birmingham, ovens	4.50
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	4.50
Portsmouth, O., ovens Connell., basis	4.50
Buffalo, ovens	7.50 to 8.00
Detroit, ovens	8.00
Philadelphia, del.	8.50

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports	
Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	7.50
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.50 to 9.00
North African low phos.	7.50 to 8.50
Swedish basic, 65%	7.50 to 8.00
Swedish low phos.	9.00
Spanish, North African basic, 50 to 60%	7.00 to 8.00
Newfoundland fdy., 55%	8.00
Tungsten, spot, short ton unit, duty paid	$10.25 to 10.50
Chrome ore, 48% gross ton c.i.f.	$17.00 to 18.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	24 cents
South African, 52%	22 to 23 cents
South African, 49-51%	21 to 22 cents
South African, 44-47%	20 to 21 cents
Indian, 48-50% (nom.)	22 cents
Brazilian, 46-48% (nom.)	18 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Maryland, Georgia, Alabama	$35.00
Missouri	35.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	25.00 to 30.00
Georgia, Alabama	30.00

SILICA BRICK

Pennsylvania	$35.00
Joliet, Ill., East Chicago, Ind.	47.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$61.50

CHROME BRICK

Per Net Ton

F.o.b. shipping point	$42.50

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	38.00
Domes, Chewelah, Wash., base	20.90

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$26.00
Pittsburgh, bessemer	26.00
Youngstown	26.00
Cleveland	26.00
Philadelphia	31.75
Chicago	28.00
Forging, Chicago	33.00 to 34.00
Forging, Pittsburgh	33.00
Forging, Philadelphia	37.75

SHEET BARS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00
Chicago	28.00

SLABS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00

WIRE RODS

Pittsburgh, Cleveland	$37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.50c to 1.60c

Ferroalloys

(In dollars, except Ferrochrome)

•Ferromanganese, 78-82%, tidewater, duty paid	$68.00
•Ferromanganese, del. Pittsburgh	73.24
Spiegeleisen, 19-20%, domestic fur. spot†	25.00
Ferrosilicon, 50 per cent, freight all., c. l.	77.50
Do, less carload	85.00
Do, 75 per cent	126.00 to 136.00
Silicomang., 2½% carb.	105.00
2% carbon	110.00
1% carbon	115.00
(Spot prices, $5 a ton higher.)	
Ferrochrome, 60-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Do, for spot delivery	10.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.10
Ferrovanadium, 30-40 per cent, per lb. contained, on analysis	3.05 to 3.30
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	8.50
Do, under 1 ton	9.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis; 18%, $2 unitage	68.00
Ferrophosphorus, electrolytic per ton carload, 23-26% f.o.b. Anniston, Ala.; 24%, $4.25 unitage	91.00
Ferromolybdenum, stand. 50-60 per cent. per lb.	0.95
Cal. Molybdate, lb. cont.	0.80
Molybdate, lb. cont.	.80

†Carloads. Differentials apply to quant.
•To users of carloads to 1000 tons annually. Differentials to large users.

Fluorspar

85 and 5 per cent grade

Washed gravel, domes., net ton, del. Pitts. equiv.	$20.31
Washed gravel, import duty paid tide. gross ton	19.50

Pig Iron

Shipments Fairly Steady—Compare Favorably with May Rate In Lake District—Sales Small

PIG IRON PRICES, PAGE 52

Pittsburgh—Pig iron sales for the week touched the lowest point of the year. Both steel and iron foundries are barely operating; the largest foundry in this district is down to one day a week. The market continues at about $15, Pittsburgh district furnace, for foundry, malleable and bessemer irons. Basic is inactive, as two of the three largest customers in this district have closed their open-hearth plants, and the one remaining operates but one furnace.

Boston—Pig iron demand continues to drag, with the price structure influenced by the method of delivery and foreign material. Most of the business is being taken by the local furnace at $16 to $17, shipping point. Outside domestic and foreign irons are not moving actively.

New York—Purchase of 300 tons of No. 2 plain and No. 2X iron by the A. P. Smith Mfg. Co., Bloomfield, N. J., from an eastern Pennsylvania furnace, features a listless pig iron market. Buffalo iron is holding at $14 to $14.50, furnace, for shipment into this territory, while eastern Pennsylvania iron is $13.50 to $14, furnace. Barge shipments from Buffalo have been exceedingly light since the beginning of navigation.

Philadelphia — Pig iron inquiry and purchasing have improved slightly, but continue restricted to small and moderate size lots. Foundry iron is $13.50 to $14, base, eastern Pennsylvania furnace. Stocks at furnace are fairly large. Included in recent sales is some Dutch hematite iron. New low phosphorus inquiries include one for 250 to 300 tons for shipment to the Cleveland district. English low phosphorus continues available here at $18.50 to $19, duty paid, tidewater, but no sales are reported.

Buffalo—Demand continues light. Shipments to Michigan melters have increased moderately.

Youngstown, O.—Occasional shipments of foundry and malleable iron are keeping down furnace stocks. New sales are light, rarely for more than 100 tons.

Cleveland—Sales dropped further during the past week, the aggregate for furnace interests with headquarters here not exceeding 2000 tons, probably the smallest of any week so far this year. Sales and shipments for one merchant producer selling mainly in western Ohio, southern Michigan, and Indiana, are at about the same level so far this month as in the comparable period last month, but for Cleveland producers the situation is less favorable. One Cleveland furnace placed about 500 tons in the Pittsburgh district in recent weeks on a reciprocal purchasing basis. The market for delivery in the Cleveland switching area is nominal at $15.50, base, furnace. In outside competitive territory less than $14.50, base, furnace, the usual price, is noted.

Cincinnati — Foundry operations in this district fail to improve, and pig iron sales are limited to carload lots. Most consumers are considerably behind scheduled shipments.

Chicago—Pig iron shipments so far this month compare favorably with the May rate. Occasional gains over shipments a month ago are reported by some sellers. New business, however, is quiet and restricted to small lots. Inquiry also lacks large tonnage. The $16, furnace, quotation on No. 2 foundry and malleable iron continues, with occasional concessions noted.

St. Louis—Foundry operations have subsided and pig iron demand is extremely limited. Less than 500 tons was sold the past week. Shipments also have receded. Anxiety to sell has resulted in some concessions, but in general, quoted prices are fairly steady.

Birmingham, Ala.—A further reduction in small orders for pig iron is noted, with no tonnages in prospect. Gulf States Steel Co. buys basic from Republic Steel Corp. as requirements arise.

Toronto, Ont.—Business in the pig iron market is slowing down for the summer season, a few carload sales being noted for the week. Melters are beginning to curtail operations. Pig iron production, however, is holding up, due to increased output of basic.

Machinery

Prevailing Lethargy Shows No Signs of Releasing Grip

New York—Activity in machine tools and equipment has slumped almost to the vanishing point, with few sales and dull inquiry. A fair number of tools for the navy and other government departments is pending and awards are being made on equipment for which bids opened several weeks ago. Bids close July 5 on another navy list for various yards.

Worcester, Mass.—New England machine building shops have generally adjusted schedules for a period of extreme dullness during the next few weeks. In addition to curtailing shop forces, some have recently made further cuts in engineering departments. Orders are limited to a few individual units with little inquiry out except for government shops and ships.

Chicago—Interest by users in purchases of machine tools and plant equipment continues extremely light and activity shows practically no change from the quietness prevailing for several months. Occasional purchases of tools are noted, frequently involving used equipment which is being disposed of at sharply depressed prices. In most cases buyers are turning to used tools rather than to new machines. Prices bid on recent auction sales of tools have been very low. Plant equipment of Warner Corp., Muncie, Ind., is being disposed of and involves about 500 cutting tools, air presses, heat treating furnaces, 193 drill presses and a large number of lathes, milling machines, shapers and gear cutters.

Pittsburgh—Steel mill equipment and special machinery interests, while figuring on considerable proposed work, are still encountering a lack of decision so far as their customers are concerned in actual closing on business. Considerable missionary work and activity in determining future equipment needs of steel mills constitutes about all the activity in the market. There appears to be a slightly better demand for welding machines.

Cleveland — Outside of occasional flurries in inquiry and the placing of a few single machines here and there, little evidence is shown by the machinery and equipment market of any substantial improvement. It is felt by some dealers that it will be Sept. 1 before any marked gain in sales is registered.

Mineral output of Alaska in 1931 was valued at $12,278,000 against $13,812,000 in 1930, states the federal geological survey.

Scrap

Low Prices Nominal as Buying Drops to Minimum—Melt Is at Low Point and Stocks Grow

Chicago—The scrap market remains at a standstill, new mill buying still being absent, while shipments against orders are either suspended or in extremely small volume. The declining trend in open-hearth operations points to no early increase in demand for heavy melting steel and dealers are making only small purchases. Sales of distress lots occasionally are made at sharply depressed prices and quotations generally are nominal. Heavy melting steel is quotably unchanged at $5.25 to $5.75, although the last mill purchase, made over a month ago, was at $6.50. Railroad offerings continue light.

Boston — Scrap demand is dull, most grades being nominal. The Worcester consumer of No. 1 steel

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	6.50 to 7.00
Boston, dealers	3.35 to 3.75
Buffalo, No. 1	6.50 to 7.00
Buffalo, No. 2	5.00 to 5.50
Chicago	5.25 to 5.75
Cleve., No. 1	6.50 to 7.00
Cleve., No. 2	6.25 to 6.75
Det., No. 1 deal.	4.50 to 5.00
Det., No. 2 deal.	2.50 to 3.00
E. Pa. del. mill	6.00 to 6.50
E. Pa., No. 2 del.	4.00
N. Y. deal, R. R.	4.00
N. Y. deal, No. 2	2.00 to 2.50
N. Y. deal. yd.	2.50 to 3.00
Pitts. No. 1	8.25 to 9.25
St. L. No. 1 sel.	5.50 to 6.00
Federal, Ill.	5.25 to 5.75
Granite City, Ill.	4.50 to 5.00
Valleys, No. 1	9.25 to 9.75

COMPRESSED SHEETS

Buffalo, dealers	5.00 to 5.50
Chi. (Factory)	4.50 to 5.00
Cleveland	6.50 to 7.00
Detroit, dealers	4.50 to 5.00
E. Pa. new mat.	5.00 to 5.50
Pittsburgh	8.00 to 8.50
Valleys	8.75 to 9.25

BUNDLED SHEETS

Buffalo	4.00 to 4.25
Cinci., deal.	4.50 to 5.00
Cleveland	6.00 to 6.50
Eastern, Pa.	5.00
Pittsburgh	7.00 to 7.50
St. Louis	1.50 to 2.00

SHEET CLIPPINGS LOOSE

Chicago	2.50 to 3.00
Cincinnati	2.50 to 3.00
Detroit, dealers	1.75 to 2.25
St. Louis	1.50 to 2.00

STEEL RAILS SHORT

Birmingham	10.00 to 10.25
Boston, dealers	4.00 to 4.50
Buffalo	9.00 to 9.50
Chicago (3 ft.)	7.00 to 7.50
Chicago (2 ft.)	7.50 to 8.00
Cinci., deal.	8.50 to 9.50
Detroit, deal	7.00 to 8.00
Pitts. (open-hearth, 3 ft. and less)	10.50 to 11.00
St. Louis	7.50 to 8.00

STOVE PLATE

Birmingham	5.50 to 6.00
Boston, dealers	2.00 to 2.50
Buffalo	6.75 to 7.00
Chicago, net	4.50 to 5.00
Cinci., deal. net	3.25 to 3.75
Det., net deal.	2.50 to 3.00
Eastern Pa.	6.00
N. Y., deal. mill	2.50 to 3.00
St. Louis	5.50 to 6.00

COUPLERS, SPRINGS

Buffalo	9.00 to 9.50
Chicago	6.50 to 7.00
Eastern Pa.	7.50 to 8.00
Pittsburgh	9.25 to 9.75
St. Louis	6.00 to 6.50

ANGLE BARS—STEEL

Chicago	6.50 to 7.00
St. Louis	6.50 to 7.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	9.00 to 9.50
Cleveland bil. and bloom crops	9.00 to 10.00
Eastern Pa.	9.00 to 10.00
Pittsburgh billet bloom crops	11.00 to 11.50
Pitts., sheet bar crops	10.75 to 11.25

FROGS, SWITCHES

Chicago	5.50 to 5.75
St. Louis	6.00 to 6.50

SHOVELING STEEL

Chicago	5.50 to 5.75
Cleveland	6.25 to 6.50
St. Louis	5.25 to 5.75

RAILROAD WROUGHT

Birmingham	6.00 to 6.50
Boston, dealers	2.00 to 2.50
Buffalo, No. 1	4.25 to 4.75
Buffalo, No. 2	6.50 to 7.00
Cinci., No. 2	4.50 to 5.00
Chicago, No. 1	4.50 to 5.00
Chicago, No. 2	5.25 to 5.75
Eastern, Pa.	6.00 to 6.50
N. Y., No. 1, deal.	2.50 to 3.00
Pitts., No. 2	8.25 to 9.25
St. Louis, No. 1	4.00 to 4.50
St. Louis, No. 2	4.50 to 5.00

SPECIFICATION PIPE

Boston	4.00 to 4.25
Eastern Pa.	7.00 to 8.00
N. Y., deal.	2.50 to 3.00

BUSHELING

Buffalo, No. 1	5.00 to 5.50
Chicago, No. 1	4.25 to 4.75
Cinn., No. 1 dl.	3.75 to 4.25
Cinn., No. 2	2.25 to 2.75
Cleve., No. 2	4.00 to 4.25
Det., No. 1 new deal.	3.25 to 3.75
St. L., No. 1	3.00 to 3.50
Val. new No. 1	8.25 to 8.75

MACHINE TURNINGS

Birmingham	3.00 to 3.50
Boston, dealers	0.50 to 1.00
Buffalo	3.50 to 4.00
Chicago	2.00 to 2.50
Cin., deal.	2.75 to 3.25
Cleveland	3.00 to 3.50
Detroit	1.75 to 2.25
Eastern Pa.	3.00 to 3.50
N. Y., deal	1.35 to 1.50
Pittsburgh	5.00 to 5.50
St. Louis	1.50 to 2.00
Valleys	6.50 to 7.00

BORINGS AND TURNINGS For Blast Furnace Use

Boston, dealers	.60 to .75
Buffalo	4.00 to 4.50
Cinn., deal.	2.75 to 3.25
Cleveland	3.50 to 4.00
Detroit, deal	2.25 to 2.75
Eastern Pa.	3.00 to 3.50
N. Y., deal	1.35 to 1.50
Pittsburgh	5.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	3.00 to 3.50
Boston, chem.	5.00 to 5.50
Boston, dealers	1.00 to 1.25
Buffalo	4.00 to 4.50
Chicago	2.00 to 2.50
Cinn., deal.	2.75 to 3.25
Cleveland	3.50 to 4.00
Detroit, deal.	2.25 to 2.75
Eastern Pa.	3.00 to 3.50
E. Pa., chem.	8.00 to 10.50
N. Y., deal.	1.50 to 2.00
Pittsburgh	5.00
St. Louis	2.75 to 3.25

PIPE AND FLUES

Cinn., deal.	3.00 to 3.50

RAILROAD GRATE BARS

Buffalo	4.00 to 4.50
Chicago, net	4.50 to 5.00
Cincinnati	4.25 to 4.75
Eastern Pa.	6.00
N. Y., deal.	3.50 to 4.00
St. Louis	4.50 to 5.00

FORGE FLASHINGS

Boston, dealers	2.50 to 3.00
Buffalo	4.00 to 4.50
Cleve. ov. 10 in.	6.50 to 7.00
Detroit	3.00 to 3.50

FORGE SCRAP

Boston, dealers	2.00 to 2.25
Chicago	7.00 to 7.50
Eastern Pa., del.	5.00 to 5.50

ARCH BARS, TRANSOMS

Chicago, net	4.50 to 5.00
St. Louis	5.00 to 5.50

AXLE TURNINGS

Boston, deal.	6.00 to 6.50
Buffalo	6.50 to 7.00
Chi., elec. fce.	4.50 to 5.00
Cleveland	6.50 to 6.75
Eastern Pa., del.	6.00
Pittsburgh, O. H.	7.50 to 8.00
St. Louis	3.50 to 4.00

STEEL CAR AXLES

Birmingham	10.00 to 10.50
Boston, ship. pt.	8.25 to 8.75
Buffalo	10.00 to 10.50
Chicago	9.00 to 9.50
Eastern Pa.	14.50
St. Louis	9.00 to 9.50

SHAFTING

Boston, ship. pt.	8.50 to 9.00
N. Y., deal.	6.50 to 7.00
St. Louis	7.50 to 8.00
E. Penna.	12.50

CAR WHEELS

Birming., iron	7.00 to 7.25
Boston, iron deal.	4.00 to 4.50
Buffalo, iron	7.00 to 8.00
Buffalo, steel	8.00 to 8.50
Chicago, iron	5.75 to 6.25
Chi., rolled steel	6.25 to 6.75
Cincinnati iron	6.75 to 7.25
E. Pa. steel	7.50 to 8.00
E. Pa. iron	9.00 to 9.50
Pitts. iron	9.50 to 10.00
Pitts., steel	9.25 to 9.75
St. Louis, iron	5.00 to 5.50
St. Louis, steel	5.00 to 5.50

NO. 1 CAST SCRAP

Birmingham	6.50 to 7.00
Buffalo (Mach.)	9.00 to 9.50
Buffalo, cupola	8.00 to 8.50
Boston, textile	7.50 to 8.00
Chicago, mach.	6.15 to 6.70
Chi., railroad	5.60 to 6.15
Chicago, agri.	5.30 to 5.90
Cinn., mach. cup.	7.50 to 8.00
Cleve. cupola	6.50 to 7.00
Det., net deal.	6.75 to 7.25
E. Pa. cupola	9.00
N. Y. cup. deal.	6.00 to 6.50
N. Y. del local foundries	7.50 to 8.00
Pitts., cupola	9.00 to 9.50
San Fran., del.	13.50 to 14.00
Seattle	5.00 to 7.50
St. L. No. 1 ma.	6.50 to 7.00
St. L., No. 1	6.00 to 6.50

HEAVY CAST

Boston, del.	3.00 to 3.50
Bost., mach. cast	7.00 to 7.50
Buffalo, break	5.50 to 6.00
Cleve., break	3.50 to 4.00
Detroit, auto. net deal.	8.00 to 8.50
Det., break., dl.	4.00 to 4.50
Eastern Pa.	7.50 to 8.00
N. Y. No. 1, dl.	4.00 to 4.25
N. Y. break, dl.	3.50 to 4.00
Pittsburgh	7.75 to 8.25

MALLEABLE

Boston Consum.	6.00 to 6.25
Buffalo	8.00 to 8.50
Chicago, agri.	5.25 to 5.75
Chicago R. R.	6.00 to 6.50
Cinci., R. R., del.	7.50 to 8.00
Cinci., agri. del.	7.00 to 7.50
Cleveland, rail	7.50 to 8.00
Det. auto deal.	5.00 to 6.00
St. Louis, rail	5.00 to 5.50

RAILS FOR ROLLING 5 feet and over

Birmingham	8.00 to 9.00
Boston, deal.	5.50 to 6.00
Buffalo	7.00 to 7.50
Chicago	7.50 to 7.75
Eastern Pa.	9.50
New York dealer	4.25 to 4.75
St. Louis	8.00 to 8.50

LOCOMOTIVE TIRES

Chicago, cut	7.00 to 7.50
St. L., No. 1	4.50 to 5.00

LOW PHOS. PUNCHINGS

Chicago	7.00 to 7.50
Buffalo	9.00 to 9.50
Eastern Pa.	9.50 to 10.00
Pittsburgh	9.50 to 10.00

is taking small shipments at $5. Cast grades are easy with little business outside of a small barge shipment to New Jersey at $7, delivered. Some grades are practically eliminated by dealers who refused to bid any price, including borings and turnings.

Yard steel is weaker, brokers offering as low as $2.50, with some business reported at that figure.

New York—Scrap buying is light, there being no activity in some grades. A dealer has offered $8 for steel car axles. No. 1 steel is still nominally $4, barge, but little is being bought and there is no rail shipment of this grade.

Philadelphia—The market on No. 1 heavy melting steel continues $6 to $6.50, delivered, but this is largely nominal. No. 2 melting steel has been sold at $4, delivered. Occasional purchases of blast furnace borings and turnings are made at $3.50, delivered Eastern Pennsylvania. One eastern Pennsylvania mill has purchased several carloads of turnings at $3, delivered. To show the narrow margin on which dealers operate, a case may be cited where a dealer sold turnings at $3, delivered eastern Pennsylvania. The dealer bought these turnings at 22 cents per ton, f.o.b. a Northern New Jersey shipping point. The freight rate to the consuming plant was $2.78. The dealer would have broken even on this deal, not counting overhead had it not been for $2 demurrage.

Buffalo—Demand for scrap is almost absent. Nominal prices prevail and most yards will be practically closed until after July 4.

Pittsburgh—The scrap market still is experiencing complete suspension of trading, with prospect of mill buying remote. There is a belief that the leading mill here will make only one purchase in July. Prices are nominally lower on several grades, justified by distress offerings and ability of brokers to buy at lower levels, though in absence of mill buying. Heavy melting steel is quotable at a range of $8.25 to $9.25, both classes of borings at $5, and compressed sheets at $8 to $8.50. One mill here is permitting shipment on orders for machine shop turnings and heavy breakable cast, otherwise there is no activity.

Cleveland—Only carloads of steel and iron scrap figure in the market here, in sales or contract shipments. Prices are largely nominal. Cast iron carwheels are soft and probably 50 cents lower, at $7.25 to $7.50 per ton.

Cincinnati — Quotations on iron and steel scrap are nominal in absence of buying. Activity is probably below 20 per cent of normal. Sales are confined to small lots.

Detroit — Further reductions of 25 cents in many scrap grades here bring the market down to the level of $4.50 to $5 for No. 1 heavy melting steel and compressed sheets. Some ordinarily large producers of scrap display a disposition to store rather than sell at present low prices. Some dealers experience more difficulty attempting to cover even small orders, and are forecasting a rise shortly.

St. Louis—Fairly liberal offerings and low consumption bring further recession in prices of iron and steel scrap to new low levels. Cuts of 50.00c were made on the three grades of heavy melting steel, bringing the minimum to $4.50 per ton on the cheapest description, and the maximum to $6 on selected steel. Prices are largely nominal in absence of orders.

Birmingham, Ala. — The scrap iron and steel market is at a standstill and not in many years has there been as little old material moving as is noted at this time. Dealers are giving little attention to replenishing their stock.

Toronto, Ont. — Trading in iron and steel scrap is at a standstill. No demand is reported for steel grades and iron scrap is spotty. Specialized demand is the only live feature and only one or two lines are moving. Machinery cast has a steady call and some interest is showing in stove plate. Dealers are out of the market and have made no revision in prices.

Canadian Scrap

Dealers' Buying Prices

Per Gross Ton

MONTREAL

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Coke

Connellsville Furnace and Heating Grades in Better Demand—70,000 Midwestern Miners Out

COKE PRICES, PAGE 52

Pittsburgh — Improved specifications continue to be received for furnace and heating grades of coke. The movement has been fairly widespread and shows a desire on the part of customers to stock coke for the summer months, believing that the present price of around $2 to $2.15 will be no lower. The movement of foundry coke, however, is at a low ebb, with the market $3 to $4.25, depending upon grade.

New York—Coke specifications are maintained at about the same rate as in the past month. Beehive furnace coke is $1.50 to $2, Connellsville, for the heating grades, and $2 to $2.25 for smelting grades. Beehive foundry is $3 to $4.25, ovens, depending upon quality. By-product foundry coke is $8.21 to $8.81, delivered, Newark, N. J.; $10, New England; and $8.50, Philadelphia.

Cincinnati — Some foundries may close entirely during July or August. This is reflected in low shipments of coke. Other grades also are inactive.

Chicago—Foundry coke shipments are unimproved, reflecting unchanged operations among most melters. The market continues $7, ovens. No agreement has been reached in the Illinois and Indiana coal strike, 70,000 miners still being idle as a result of failure to compromise on the new wage scale to supplant the $6 daily rate in effect prior to April 1.

St. Louis—New orders and shipments for metallurgical coke have declined from the low levels noted earlier this month. Total shipments for June are likely to be the smallest for any month in more than two decades. Water gas producers, inquiring recently for furnace coke, have not closed.

Birmingham, Ala.—Coke oven operations have dropped to less than 40 per cent. Independent producers are particularly vigilant in holding down stocks. Prices are weak.

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 5.75c, Conn., for copper

Sheets	
Yellow brass (high)	12.00
Copper, hot rolled	14.87½
Lead sheets, cut, to jobbers	6.50
Zinc sheet (100-lb. base)	9.00
Tubes and Pipes	
Seamless yellow brass (high)	15.25
Seamless copper	14.37½
Rods	
Yellow brass (high, full turnings)	9.75
Naval brass	10.87½
Anodes	
Copper untrimmed	11.75
Wire	
Yellow brass (high)	12.00

Old Metals

Dealers' buying prices, cents lb.

No. 1 Composition Red Brass	
New York	2.62½ to 2.75
Chicago	1.87½ to 2.00
Cleveland	2.50 to 3.00
St. Louis	2.25
Heavy Yellow Brass	
New York	1.75 to 1.87½
Heavy Copper and Wire	
New York	3.50 to 3.62½
Chicago, No. 1	3.00 to 3.25
Cleveland	2.75 to 3.00
St. Louis	2.75
Composition Brass Borings	
New York	2.25 to 2.50
Yellow Brass Tubing	
Cleveland	1.25 to 1.75
Light Copper	
New York	2.75 to 3.00
Chicago	2.00 to 2.25
Cleveland	2.25 to 2.50
St. Louis	2.25
Light Brass	
Chicago	1.12½ to 1.25
Cleveland	1.00 to 1.25
St. Louis	1.25
Lead	
St. Louis	2.00
Zinc	
New York	0.75 to 1.00
Cleveland	0.87½ to 1.00
St. Louis	1.00
Aluminum	
Clippings, new, soft, Cleve.	9.00 to 9.50
Clippings, hard, Cleveland	6.50 to 7.00
Borings, Cleveland	2.50 to 3.00
Mixed cast, Cleveland	3.25 to 3.75
Mixed cast, St. Louis	2.50 to 3.00

Secondary Metals

Remelt, aluminum No. 12	7.00 to 8.00
Brass ingots, 85-5-5-5	6.00

Metals

Copper Fails to Respond to Imposition of Tariff—Zinc Eases —Tin and Lead Steady

New York—Demand for all metals was light last week but the price situation continued fairly steady except with regard to zinc.

Copper—Failure of the copper market to respond pricewise to the imposition of the 4-cent import duty on the metal proved somewhat of a disappointment to some sellers. Metal continued available from custom smelters at 5.37½c, Connecticut, for delivery through third quarter. In some directions metal could be had for fourth quarter shipment at the same price although others asked 5.50c.

The new tariff brought increased inquiry into the market but sales were in comparatively small volume. Much of the business done was for future delivery since the consensus of opinion points to a slightly better price structure before the year closes. Heavy stocks in this country and abroad will continue to serve as depressing factors on the market for some time, however. Brass ingot and fabricated product prices held unchanged.

Tin—Statistical position of the tin market was measureably improved last week by the formal announcement by the International Tin committee that leading tin producing countries would ban exports during July and August and also cut production during the coming 12 months to a total of 54,056 tons or to one-third of the actual 1929 output. Deliveries in the United States alone last year aggregated 63,450 tons. Prices so far have not reflected to any extent the plans for further curtailment although the general level last week was somewhat above that of the preceding period.

Zinc—Easiness developed in the zinc market toward the latter part of the week when some sellers offered metal at concessions of five points from the 2.80c, East St. Louis, level recently prevailing. Position of the zinc smelters recently has been made more unsatisfactory with the proportionately greater rise in ore prices than in the refined metal.

Lead—Prices held steady but buying was off considerably compared with the preceding week. June needs are well covered but some metal still must be booked for July.

Antimony—Spot metal held fairly steady but futures were off somewhat.

Aluminum—Prices held steady but demand was slow. Duty has been cut on certain alloys used principally by the iron and steel industry.

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.20
90 per cent benzol	0.26
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26
Per Pound at Producers' Plants	
Phenol	0.153 to 0.173
Per Pound at Producers' Plants in	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.00

Coke By-Products Firm; Due to Light Output

New York—Coke by-products activity is unchanged, and prices are steady. Output continues light and lack of material has a firming influence. Toluol continues in short supply, few distributors being in a position to ship sizable orders at once. Some decline is noted in the movement of naphthalene.

Nonferrous Metal Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
June 18	5.37½	5.87½	5.12½	19.60	20.05	3.00	2.90	2.80	22.90	5.00	35.00
June 20	5.37½	5.87½	5.12½	19.40	19.85	3.00	2.90	2.80	22.90	5.00	35.00
June 21	5.37½	5.87½	5.12½	19.62½	20.10	3.00	2.90	2.80	22.90	5.00	35.00
June 22	5.37½	5.87½	5.12½	19.65	20.10	3.00	2.90	2.80	22.90	5.00	35.00
June 23	5.37½	5.87½	5.12½	19.55	20.00	3.00	2.90	2.77½	22.90	5.00	35.00
June 24	5.37½	5.87½	5.12½	19.35	19.80	3.00	2.90	2.75	22.90	5.00	35.00

Pacific Coast

Hoover Dam Plates Feature of Present Market as Bids Are Being Considered—Other Demand Is for Small Lots with Shapes Leading—Some Pipe Tonnage Is Coming Out but Lots Are Small

San Francisco—(*By Air Mail*)—Interest this week is centered in the award of close to 60,000 tons of plates for the Hoover dam project. Preliminary inspections of bids indicated that the combination bids of the Babcock & Wilcox Co., New York, were low, with the Western Pipe & Steel Co., San Francisco, second and A. O. Smith Corp., Milwaukee, third. A matter of $1,000,000 freight charges, and variance in size of the 12 alternative combinations of pipe involved may affect the award.

Demand for mild steel bars is limited to small lots and prices appear firm at 2.10c, c.i.f. Concrete bar awards totaled less than 600 tons. Unnamed interests took 160 tons for two bridges over the Methow river, Wash., and 135 tons for a trestle in Oakland, Calif.

Plate bookings were confined to lots of less than 100 tons. Pacific Fruit Express will places its requirements for bulkheads, involving approximately 1000 tons, in small tonnages as required, it is reported. Los Angeles will open bids Aug. 2 for 400 tons for a boiler plant at Wilmington. Prices hold at 2.00c, c.i.f.

Demand for structural shapes is holding up well. Judson-Pacific Co. secured 180 tons for a bridge in San Luis Obispo county, Calif. The Kyle Steel Construction Co. will fabricate 805 tons for the Rio Honda and Los Angeles river bridges for Los Angeles, but the county will furnish 605 tons of the plain material. Bids will be opened July 14 for 450 tons for a post office at Glendale, Calif.

Bids have been opened on 600 tons of cast iron pipe for Hamilton Field, Calif. The American Cast Iron Pipe Co. was low bidder on 115 tons for Upland, Calif. The W. W. Pipe Shop secured 400 tons of ¾ to 8-inch standard steel pipe for Long Beach, Calif.

Structurals Lead Demand

Seattle—Awards in the Pacific Northwest approximated 400 tons this week. Prospective business is confined almost entirely to structurals, several state and county bridges being up for figures. Other items are in poor demand. Subcontracts let this week include 100 tons structurals for the University of Washington law school to Hofius Steel & Equipment Co., Seattle; 105 tons reinforcing for the Art Museum, Seattle, to Pacific Coast Steel Co., Seattle; 136 tons 4, 6 and 8-inch cast iron pipe for McNeil Island, Wash., federal penitentiary to R. D. Wood & Co., Philadelphia; 50 tons 6 to 14-inch pipe for Sumner, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

Mercer Steel Co., Portland, Oreg., has the contract for an unstated tonnage of concrete bars for the Irvington school, Portland. Washington highway department will open bids July 12 for a 445-foot steel span to cross the Skykomish river, two bridges, 180 feet and 90 feet, respectively, also two 45-foot girder spans in Snohomish county. Tonnages are not yet available. State highway figures show an average monthly payroll in the 15 months ending March 31, 1932, in excess of $1,000,000.

Steel in Europe

Germany Increases Steel Control—Rail Price Cut

London—(*By Cable*)—Socialization of steel, iron and coal in Germany is advanced by impending transfer to the Reich-controlled Dresdener bank of the holdings in Vereinigte Stahlwerke of Dr. Friedrich Flick. This gives the Reich control of about 40 per cent of German pig iron and rolled iron production and nearly 16 per cent of coal and iron ore.

International Rail Manufacturers association has reduced the price on steel rails to £5 10s from £5 17s 6d. Disappointment in development of British markets is the principal factor of the present situation. Indian pig iron still undersells Midland iron. Billet makers are offering rerollers a graduated scale according to specification. Canadian consumers have been showing some interest in Scottish steel.

Continental markets are dull. Berlin reports export demand for ferroalloys improved for shipment to America, Ireland is buying ship plates and Russia has confirmed the order to Polish mills for 50,000 tons of steel.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, June 23

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON		£ s d		£ s d
Foundry, 2.50-3.00 Silicon	$10.59	2 18 6	$ 8.75 to $ 9.23	1 16 0 to 1 18 0
Basic bessemer	10.14	2 16 0*	7.41 to 7.90	1 10 6 to 1 12 6
Hematite, Phos. .03-.05	11.31	3 2 6	.....	.....
SEMIFINISHED STEEL				
Billets	$17.65	4 17 6	$ 9.48	1 19 0
Wire rods, No. 5 gage	27.15	7 10 0	21.87	4 10 0
FINISHED STEEL				
Standard rails	$29.87	8 5 0	$26.73	5 10 0
Merchant bars	.99c	6 2 6	.48c to .50c	2 4 0 to 2 5 0
Structural shapes	1.19c	7 7 6	.44c to .45c	2 0 0 to 2 1 0
Plates, †¾ in. or 5 mm	1.42c	8 15 0	.58c to .59c	2 13 0 to 2 14 0
Sheets, black, 24 gage or 0.5 mm.	1.30c	8 0 0	1.17c to 1.20c	5 6 0 to 5 9 0
Sheets, gal., 24 gage, corr.	1.56c	9 12 6	1.51c	6 17 6
Bands and strips	1.30c	8 0 0	.72c to .74c	3 5 0 to 3 7 6
Plain wire, base	1.54c	9 10 0	1.18c	5 7 6
Galvanized wire, base	1.86c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	1.78c	11 0 0	1.21c	5 10 0
Tin plate, box 108 lbs.	$ 2.72	0 15 0	$3.20	0 13 2

British ferromanganese $72 to $75 delivered Atlantic seaboard, duty paid. German ferromanganese £9 0 s0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		£ s d	French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$10.59	2 18 6	$ 8.67	220(2)	$ 8.76	315	$16.42	69
Basic bessemer pig iron	10.14	2 16 0*	7.29	185(1)	7.23	260	17.96	75.50
Furnace coke	2.40	0 13 3	4.89	124	4.03	145	4.57	19.20
Billets	18.10	5 0 0	14.58	370	10.15	365	22.96	96.50
Standard rails	1.36c	8 7 6	1.41c	785	1.57c	1,210	1.37c	121
Merchant bars	1.07c	6 12 6	.95c	530	.54c	415	1.19c	110
Structural shapes	1.42c	8 15 0	.99c	550	.54c	415	1.16c	107.50
Plates, †¼-in. or 5 mm	1.46c	9 0 0	1.17c	650	.70c	535	1.37c	127
Sheets, black	1.34c	8 5 0§	1.44c	800‡	.88c	675‡	1.56c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	1.54c	9 10 0	2.83c	1,570	1.78c	1,370	4.00c	370
Plain wire	1.54c	9 10 0	2.03c	1,130	1.95c	1,500	1.92c	178
Bands and strips	1.54c	9 10 0	1.04c	580	.88c	675	1.37c	127

*Basic. †British ship-plates, Continental, bridge plates. §24 ga. ‡1 to 3 mm. basis price.
British quotations are for basic open-hearth steel, Continental usually for basic-bessemer steel.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	58	44½	⅛	25	7
¼	62	50½	¾	30	13
1—3	64	52½	1—1¼	33	17
			1½—2	37	20

LAP WELD

2	57	45½	2	25	11
2½—6	61	49½	2½—3½	30	15
7—8	58	45½	4—6	32	19
9—10	56	43½	7—8	31	18
11—12	55	42½	9—12	28	13

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+11	+46
¾	60	49½	½	25	9
1—1½	62	51½	¾	30	14
2—3	63	52½	1—2	36	20

LAP WELD

Extra strong, plain ends

2	55	44½	2	31	15
2½—4	59	48½	2½—4	36	22
4½—6	58	47½	4½—6	35	21
7—8	54	41½	7—8	33	19
9—10	47	34½	9—12	23	10
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. Direct mill shipments, base, 5 and 2½. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½ 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft. 55%
Selected lengths, 1—18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ... $32.00 to 33.00
Four-inch, Birmingham ... 36.00 to 37.00
Four-inch, Chicago ..... 38.40 to 42.40
Six to 24-inch, Chicago..... 34.40 to 38.40
Six-inch and over, N. Y..... 26.00 to 28.00
Four-inch, New York ..... 32.50 to 34.50
Stand. fittings, Bir. base... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

(All Philadelphia prices subject to quantity differentials except reinforcing and Swedish bars)

STEEL BARS

Baltimore	2.75c
Boston	3.25c
Buffalo	2.95c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.65c
Los. Ang.	3.30c
New York‡(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.60c
Portland	2.75c
San Fran.	3.25c
Seattle	3.00c
St. Louis	3.00c
St. Paul	2.85c
Tulsa	3.25c

IRON BARS

Baltimore	2.75c
Boston	3.25c
Buffalo	3.15c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia	2.45c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS

Baltimore	2.35c-3.00c
Boston	3.25c
Buffalo	2.95c
Chattanooga	3.00c
Cincinnati	3.00c
Cleveland	2.10-2.25c
Detroit	2.85c
Houston	3.00c
Los. Ang. cl.	2.10c
Los Ang., lcl	2.40c
New York	2.65c-3.10c
Phila.	2.26½c
Pittsburgh	2.60c
San Fran. cl.	2.50c
San Fran. lcl	2.80c
Seattle	3.00c
St Louis	3.15c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore	2.75c
Boston	3.35c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los. Ang.	3.30c
New York(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.85c
Portland	2.75c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore	2.75c
Boston	3.35c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.30c
New York(d)	3.30c
Philadelphia	2.45c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	2.75c
San Fran.	3.25c
Seattle	3.00c
St Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore	3.25c
Boston	3.50c
Buffalo	3.45c
Chattanooga	3.50c
Chicago	3.20c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.35c
Houston	3.35c
Los Ang.	3.60c
N. Y.	3.00c
Portland	3.75c
Phila.*† (e)	2.90c
Pitts.**	3.00c
San Fran.	3.50c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.20c
Buffalo	3.70c
Chattanooga	3.65c
Chicago	3.55c
Cincinnati	3.75c
Cleveland	3.25c
Detroit	3.50c
Los Ang.	4.20c
New York	3.75c-4.00c
Phila.*†(e)	3.40c
Pitts.**	3.40c
Portland	4.25c
San Fran.	4.05c
Seattle	4.50c
St. Louis	3.80c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	4.75c
Buffalo	4.05c
Chattanooga	3.95c
Chicago	4.10c
Cincinnati	4.25c
Cleveland	3.75c
Detroit	4.00c
Houston	4.25c
Los. Ang.	4.50c
New York	4.00c-4.10c
Phila.*†(e)	3.75c
Pitts.**	3.90c
Portland	4.75c
San. Fran.	4.55c
Seattle	5.00c
St Louis	4.35c
St. Paul	4.19c
Tulsa	5.10c

BANDS

Baltimore	3.25c
Boston	3.75c
Buffalo	3.30c
Chattanooga	3.20c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	3.65c
Los Ang.	3.80c
New York(d)	3.40c
Philadelphia	2.75c
Pittsburgh	2.95c
Portland	3.25c
San Fran.	3.65c
Seattle	3.50c
St. Paul	3.20c
Tulsa	3.45c

HOOPS

Baltimore	3.25c
Boston	4.90c-5.40c
Buffalo	3.90c
Chicago	3.50c
Cincinnati	3.75c
Cleveland	3.55c
Det. No 14 & lighter	3.65c
New York	3.75c
Philadelphia	3.00c
Pittsburgh	3.80c
Seattle	5.00c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	2.95c
Chattanooga*	3.65c
Chicago	2.95c
Cincinnati	3.29c
Cleveland	2.95c
Detroit	3.17c
Los Ang. (a)	4.25c
New York	3.30c
Philadelphia*	3.10c
Pittsburgh	2.95c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.50c
St. Paul (a)	3.20c
St. Louis	3.54c
Tulsa	4.65c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted. (a) Rounds hex only

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	3.95c
Chicago (soft) (b)	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(b) Net base straightening, cutting, boxing 1 ton or more.

(c) Plus mill, size and quantity extras.

(d) Minus quant. diff.

(e) New mill classif.

‡Domestic bars.

*Plus quan. extras.

**Less than 25 sheets.

*†50 or more bundles.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New York

BROOKLYN—Morgan Stove Repair Foundry Co. has been incorporated with 200 shares no par value by S. Dubin, 160 Broadway, New York.

NEW YORK—Realty Iron Works has been incorporated with $10,000 capital by S. J. Bedell, 50 Court street.

NEW YORK—Metroscope Metal Products Corp., has been incorporated with $10,000 capital by P. L. Liebman, 270 Broadway.

NEW YORK—Sterling Iron Works has been incorporated with 200 shares no par value by D. E. Ifshin, 277 Broadway.

NEW YORK—Bronx Steel Supply Co. has been incorporated with $10,000 capital by A. Stiefel, Mt. Vernon, N. Y.

New Jersey

MILLVILLE — Convertible Duplex Die Corp. has been incorporated with 150 shares no par value by John B. Siech Jr., Millville.

Pennsylvania

SCRANTON — Eastern Specialties Corp. has been incorporated with $25,000 capital to manufacture tools, machinery and machined metal parts, by William E. Bright, Scranton.

Ohio

CLEVELAND—East Shore Machine Products Co., 831 East 140th street, has had plans made by Andrews-Preston Co., 308 Euclid avenue, for a shop addition, 28 x 69 feet.

HAMILTON—Company is forming by Fargo Engineering Co., H. S. Hunt in charge, Chicago, to canalize Miami river and erect hydroelectric plant near Hamilton. Preliminary plans have been sketched.

Michigan

FLINT—Flint Structural Steel Co., Davison road, has been incorporated to erect steel structures and bridges, with $10,000 capital, by Arthur G. Bishop, 606 East Kearsley street.

Illinois

CHICAGO—Modern Air Cooling Co., 111 West Washington street, has been incorporated with 1000 shares no par value to manufacture heating and cooling devices, by Kopald, Zeinshenk & Katz, 2027 Conway building.

CHICAGO — Automatic Mutual Ticket Protector Corp., Sherman hotel, has been incorporated with 40,000 shares no par value to manufacture mechanical devices, by Philip K. Weinig, 1 North La Salle street.

Missouri

KANSAS CITY — Current River Power Co., Ralph W. Street, president, has been given a preliminary permit for a hydroelectric power plant on the Current river.

Oklahoma

TULSA—Marathon Oil Co., A. J. Slaghter, Thompson building, general superintendent, plans to spend $1,000,000 on improvements to its oil refineries at Bristow, Okla., and Fort Worth, Tex. Additional cracking stills and power plant equipment is planned.

Texas

ABILENE—Abilene Refinery has been incorporated with $10,000 capital to build an oil refinery, including power plant equipment. C. W. Prewitt is president.

HOUSTON—Neches Iron Co. has been incorporated with $10,000 capital by W. Brown, president.

Wisconsin

CLINTONVILLE—Atlas Conveyor Co. Inc. has been formed to manufacture stationary and portable conveyors, rock and gravel handling equipment, by D. P. Rohrer, W. C. Schumacher and C. W. Zachow.

KENOSHA—Anderson & Co., Chicago, are low bidders at $156 700 for the general construction of the new $300,000 postoffice here.

MILWAUKEE—Fischer & Co., 300 Iowa street, Dubuque, Iowa, have given a contract to the Vilter Mfg. Co., Milwaukee, for refrigerating equipment for a $200,000 ice and cold storage plant. Motors, controls and similar equipment have been awarded to the Ideal Electric & Mfg. Co., Mansfield, O.

OSHKOSH—Pearse, Greeley & Hanson, engineers, 6 North Michigan boulevard, Chicago, are preparing estimates of the engineering cost of an intercepting sewer and pumping plant for which $250 000 bonds have been authorized. George Randall is city engineer.

OSHKOSH—Steps have been taken by the city council toward issuing $200,000 in bonds for building a new storage plant for the municipal waterworks, consisting of several elevated steel tanks and 9500 feet of connecting mains. A. L. Boley is city engineer.

Iowa

OELWEIN—Chicago Great Western railroad, general offices, Chicago has announced plans for remodeling and enlarging its shops here at cost of $150,000.

Pacific Coast

SEATTLE—Reliance Iron & Wire Works plant and contents, 1327 Weller street, burned. Rebuilding plans being considered.

SEATTLE—A. B. Mfg. Co., 2702 First avenue South, has been incorporated with $24,500 capital, to deal in steel, iron and manganese, by W. N. Crenshaw, H. W. Crenshaw and H. V. Asp.

OLYMPIA, WASH.—Okanogan Growers Power Co., represented by H. D. Mitchell and A. W. Johnston, is seeking a permit to build a $300,000 power plant and reservoir.

Dominion of Canada

VICTORIA, B. C.—British Columbia Electric Railway Co. Ltd. is receiving bids here for a fireproof powerhouse at Port Alberni, on the west coast of Vancouver island, for a third power unit for the National Utilities Corp., 30 x 65 feet, to cost $20,000.

HAMILTON, ONT.—Hamilton Auto Parts Co. Ltd. has been incorporated with $25,000 capital and 15,000 shares no par value to manufacture automotive parts, by Jack Mandell, Hamilton.

TORONTO, ONT. — International Everready Co. Ltd. has been incorporated with $6000 capital and 50,000 shares no par value to manufacture electric batteries, machinery and devices, by Howard A. Harrison, Toronto.

New Trade Publications

SHEETS AND PLATES—Worth Steel Co., Claymont, Del., is distributing two bulletins, one devoted to blue annealed sheets and the other to steel plates, sheared, up to 150 inches wide. Quality in these products is the text of the bulletins.

SLUDGE REDUCTION EQUIPMENT—Stedman's Foundry & Machine Works, Aurora, Ind., in bulletin No. 130 reviews the necessity of proper and economical disposition of sewage sludge and show application of its equipment for this purpose. Operating cost data are included.

ELECTRIC LOCOMOTIVES — Atlas Car & Mfg. Co., Cleveland, in catalog 1245 gives complete coverage of its line of electric locomotives, emphasizing advantages of this form of traction in industry. Seven divisions are covered, coal mining, metal mining, tunnel driving, load carrying, switching, industrial, contracting and trolley locomotives. It is illustrated and the various types of locomotives, details, charts of performance and full specifications are given.

HEADING SPECIALISTS

Special screws of great variety made to order

Quality rivets and studs from all grades of materials to order only for other manufacturers.

Progressive Manufactured Products are made on both a quality and price basis, their uniformity of construction insures you against slowing down in your assembly operation.

Manufacturers learn to admire business concerns for what they are and what they do, a great many parts now made on screw machines lend themselves to heading which results in great savings and improved service. Have our specialists consult with you, our service is free and we might suggest something that may prove of considerable importance to you.

The Progressive Manufacturing Company

TORRINGTON, CONN., U. S. A.

IN STOCK AT ALL TIMES—

Standard Machine Screws
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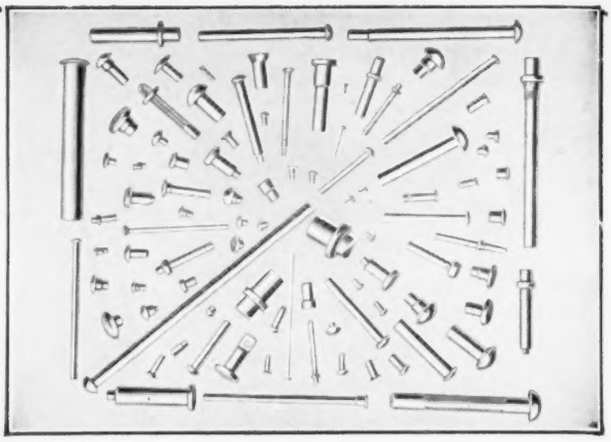

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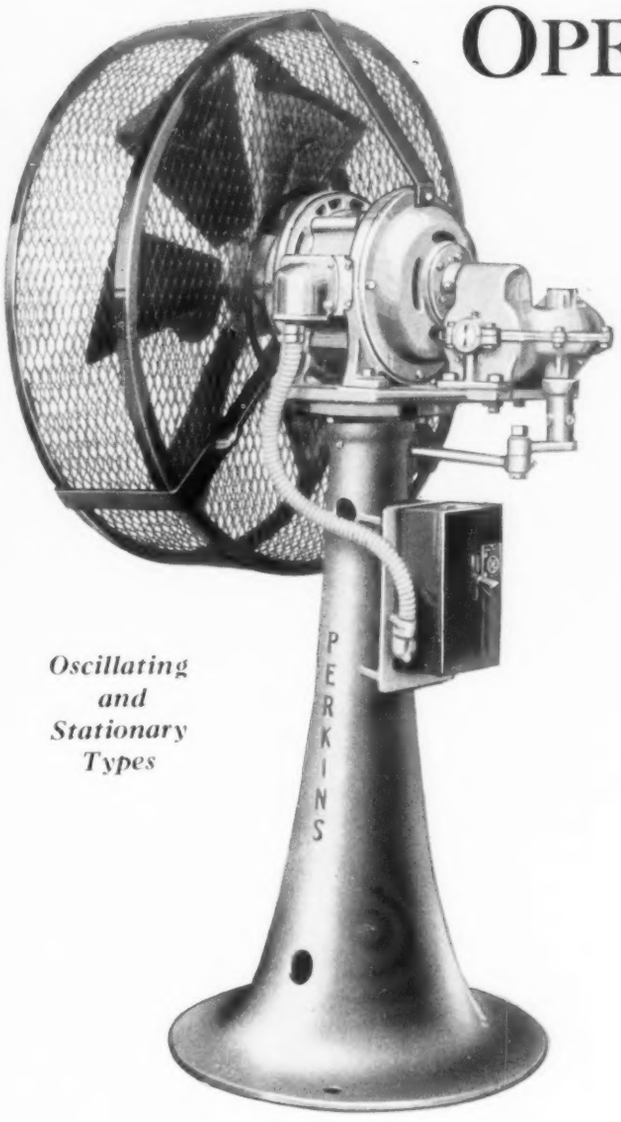

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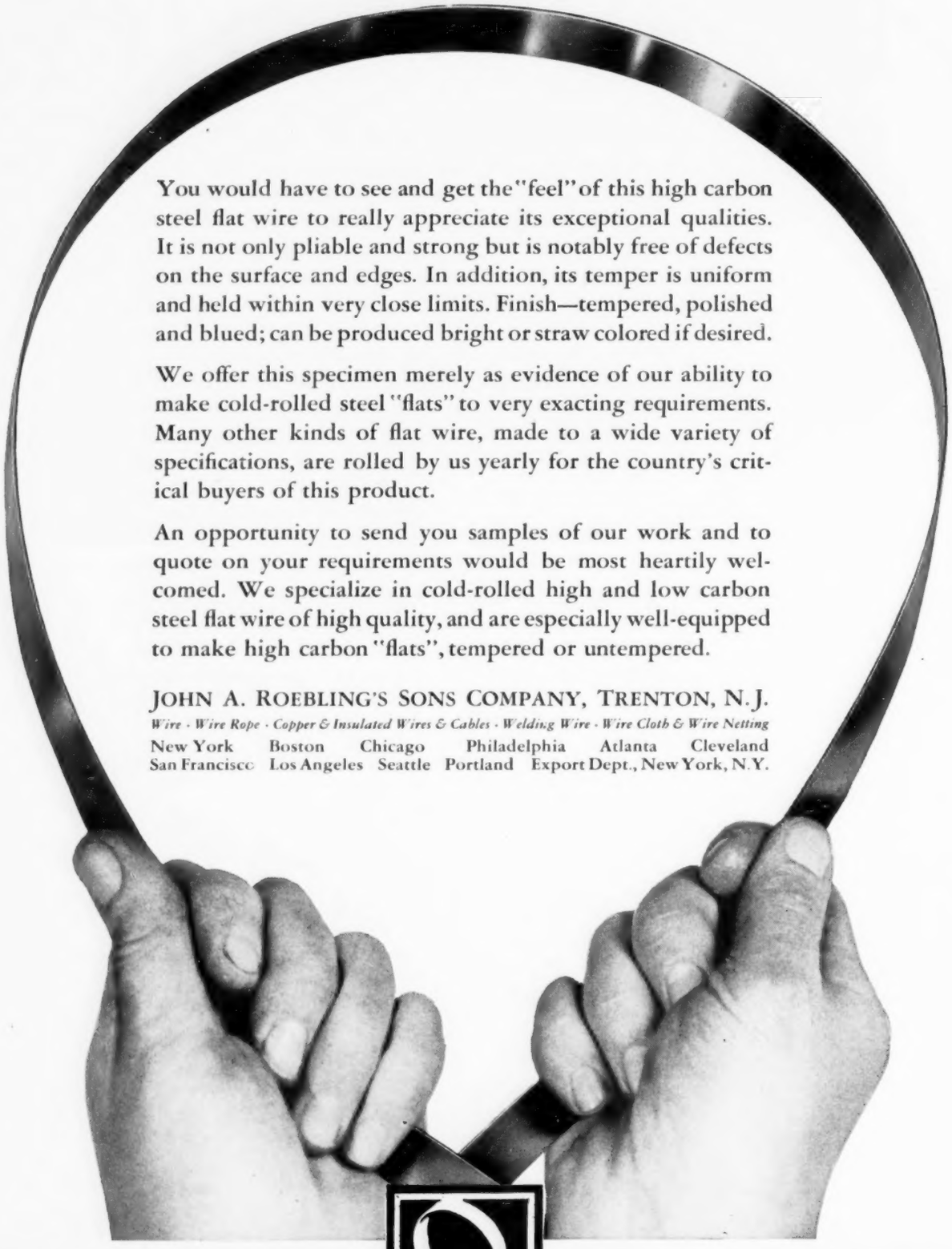

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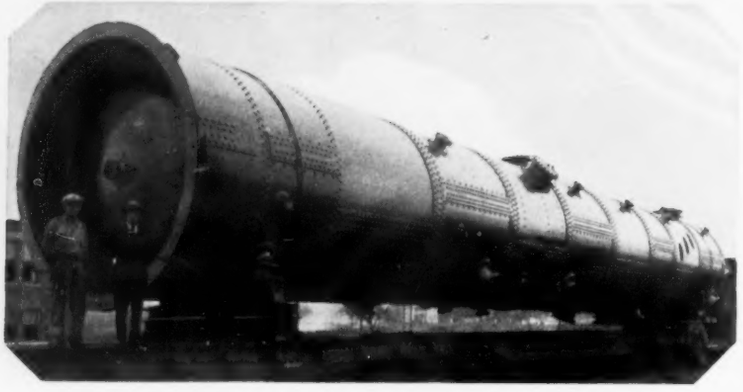

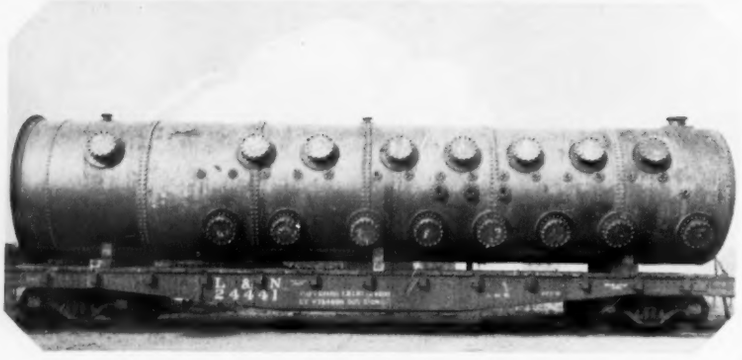

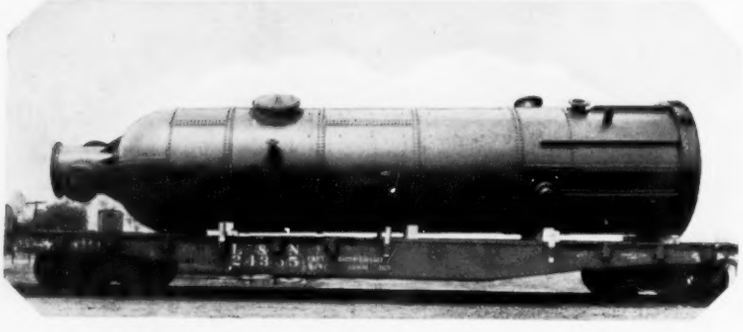

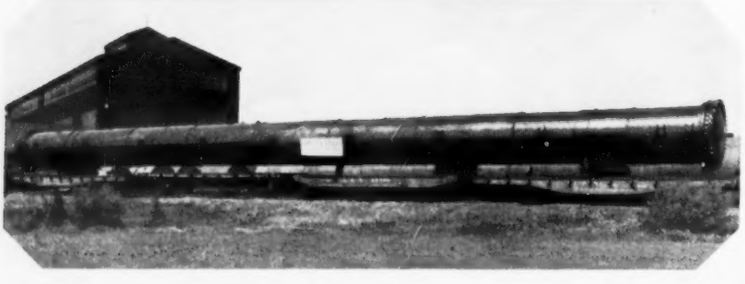

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Vanadium Corp. of America, 120 Broadway, New York City.

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 East 42nd St., New York City.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROVANADIUM
Vanadium Corp. of America, 120 Broadway, New York City.

FLASKS (Foundry)
Truscon Steel Co., Youngstown, O.

FLOORING STEEL
Acme Steel Co., 2840 Archer Ave., Chicago, Ill.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

FLOORS
Union Products Co., 1252 W. 70th St., Cleveland, O.

FLUORSPAR
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

FORGING BILLETS—See BILLETS (Forging)

FORGING MACHINERY
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.

FORGINGS (Brass, Bronze, Copper)
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

FORGINGS (Drop)
Bethlehem Steel Co., Bethlehem, Pa.
Fruin Drop Forge Co., 341-355 W. Root St., Chicago.
Modern Die & Drop Forge Co., Blue Island, Ill.
Rockford Drop Forge Co., Rockford, Ill.

FORGINGS (Iron and Steel)
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Modern Die & Drop Forge Co., Blue Island, Ill.
Rockford Drop Forge Co., Rockford, Ill.

FORGINGS (Upset)
Bethlehem Steel Co., Bethlehem, Pa.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FURNACE CONTROLS (Open Hearth)
Morgan Construction Co., Worcester, Mass.

FURNACE INSULATION—See INSULATION

FURNACES (Blast)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
McClintic-Marshall Corp., Bethlehem, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland.

FURNACES (Electric Heating)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa.

WHERE-TO-BUY

FURNACES (Electric Melting)
Ajax Electrothermic Corp., Trenton, N. J.
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa.

FURNACES (Forging)
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.

FURNACES (Open-Hearth)
Criswell, James, Co., Keenan Bldg., Pittsburgh.
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.

FURNACES (Recuperative)
Electric Furnace Co., The, Wilson St., Salem, O.

FURNACES (Steel Mill)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Morgan Construction Co., Worcester, Mass.

FURNACES (Steel Treating, Annealing & Case Hardening)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Swindell-Dressler Corp., P. O. Box 1753, Pittsburgh, Pa.

GALVANIZING
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh, Pa.

GAS HOLDERS
McClintic-Marshall Corp., Bethlehem, Pa.

GAS METERS—See METERS (Gas and Air)

GAS PRODUCER PLANTS
Flinn & Dreffein Co., 308 W. Washington St., Chicago.
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Semet-Solvay Engineering Co., 40 Rector St., New York, N. Y.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

GAS RECOVERY COKE OVEN & GAS PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.
Semet-Solvay Engineering Co., 40 Rector St., New York, N. Y.

GAUGES (Indicating and Recording)
General Electric Co., Schenectady, N. Y.

GEAR BLANKS
Bethlehem Steel Co., Bethlehem, Pa.

GEARS AND GEAR CUTTING
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.
General Electric Co., Schenectady, N. Y.
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Simonds Mfg. Co., 25th St. & Liberty Ave., Pittsburgh, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh.

GENERATING SETS
General Electric Co., Schenectady, N. Y.

GENERATORS (Acetylene)—See ACETYLENE GENERATORS

GENERATORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland, O., Dept. 20-C.

GRINDERS (Electric Pneumatic, Portable)
Cleveland Pneumatic Tool Co., The, 3734 E. 78th St., Cleveland, O.

GRINDING MACHINES (Plain and Universal)
Norton Co., Worcester, Mass.

GRINDING MACHINES (Roll)
Norton Co., Worcester, Mass.

GRINDING MACHINES (Tool and Cutter)
Norton Co., Worcester, Mass.

GRINDING WHEELS
Norton Co., Worcester, Mass.

HAMMER RAMS
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.

HAMMERS (Chipping, Riveting, Calking)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.

HAMMERS (Drop)
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Morgan Engineering Co., Alliance, O.

HAMMERS (Power)
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

HAMMERS (Steam)
Alliance Machine Co., The, Alliance, O.
Morgan Engineering Co., Alliance, O.

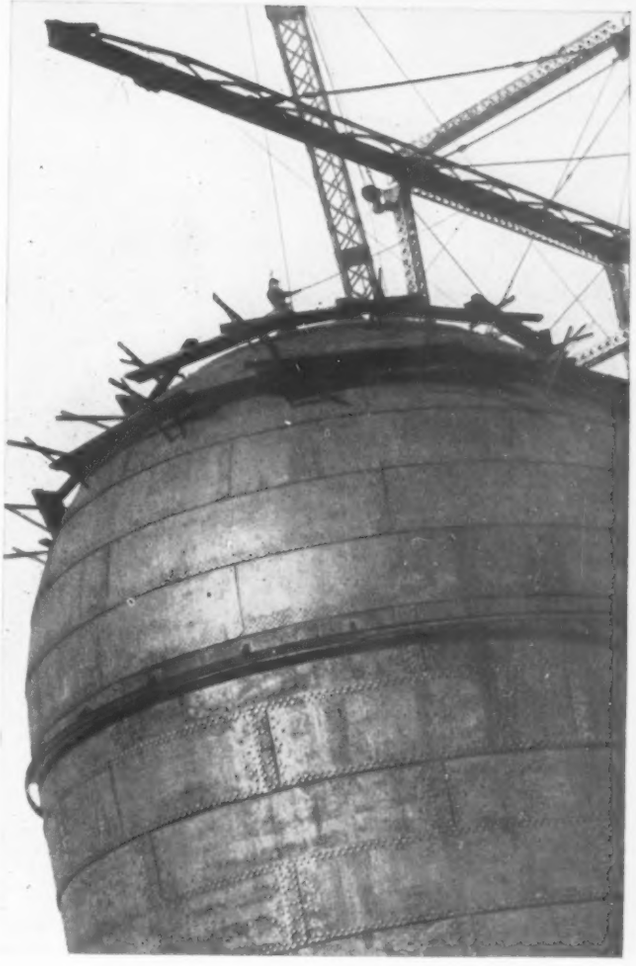
HEATERS (Electric Roll)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.

HEAT TREATING (Commercial)
Lakeside Steel Improvement Co., 5418 Lakeside Ave., Cleveland, O.

HOISTS (Electric)
Box Crane & Hoist Corp., Janney & E. Ontario Sts., Philadelphia, Pa.
Roeper Crane & Hoist Works, 1729 N. 10th St., Reading, Pa.
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.) (Sprague Hoist Div.)

HOOPS AND BANDS
Acme Steel Co., 2840 Archer Ave., Chicago, Ill.
Sharon Steel Hoop Co., Sharon, Pa.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

STEEL PLATE CONSTRUCTION



500,000 cu. ft. capacity High-Pressure Gas-Holder

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Subsidiary of Bethlehem Steel Corporation
General Offices: Bethlehem, Pa.

District Offices in New York, Boston, Philadelphia, Baltimore, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, San Francisco, Los Angeles
Export Distributor: Bethlehem Steel Export Corporation, New York City

McClintic-Marshall

WHERE-TO-BUY

HOT BLAST STOVES
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

HYDRAULIC MACHINERY
Bethlehem Steel Co., Bethlehem, Pa.
Morgan Engineering Co., Alliance, O.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

INGOT MOLDS
Bethlehem Steel Co., Bethlehem, Pa.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Corp., Hubbard, Ohio.

INSTRUMENTS (Electric Indicating and Recording)
General Electric Co., Schenectady, N. Y.

INSULATING BLOCK
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

INSULATING BRICK
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

INSULATING POWDER AND CEMENT
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

INSULATION (Furnace, Boiler Settings, Ovens, Etc.)
Armstrong Cork & Insulation Co., 920 Concord St., Lancaster, Pa.

IRON (Bar)
Bethlehem Steel Co., Bethlehem, Pa.
Burden Iron Co., Troy, N. Y.

IRON ORE
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna Furnace Corp., The, Buffalo, N. Y.
Interlake Iron Corp., Union Trust Bldg., Cleveland, O.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.

KNIVES AND SHEAR BLADES—See SHEAR BLADES AND KNIVES

LATHES (Roll Turning)
Lewis Fdry. & Mach. Co., P. O. Box 1591, Pittsburgh, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.

LEAD POTS—See POTS

LIFTING MAGNETS—See MAGNETS (Lifting)

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES (Storage Battery)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.

LUBRICANTS (Gear)
Pennsylvania Lubricating Co., The, 34th & Smallman Sts., Pittsburgh, Pa.

LUBRICANTS (High Temperature)
Pennsylvania Lubricating Co., The, 34th & Smallman Sts., Pittsburgh, Pa.
Pittsburgh, Pa.

LUBRICANTS (Neck)
Pennsylvania Lubricating Co., The, 34th & Smallman Sts., Pittsburgh, Pa.

LUBRICANTS (Pressure)
Pennsylvania Lubricating Co., The, 34th & Smallman Sts., Pittsburgh, Pa.

LUBRICANTS (Roller Bearing)
Pennsylvania Lubricating Co., The, 34th & Smallman Sts., Pittsburgh, Pa.

LUBRICANTS (Steel Mill)
Pennsylvania Lubricating Co., The, 34th & Smallman Sts.,

LUGS (Terminal)
Wolverine Tube Co., 1435 Central Ave., Detroit, Mich.

LUMBER (Creosoted or Zinc)
Century Wood Preserving Co., Koppers Bldg., Pittsburgh, Pa.

MACHINE WORK
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.

MACHINERY (Special)
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Lewis Fdry. & Mach. Co., P. O. Box 1591, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
National Roll & Fdry Co., Avonmore, Pa.

MAGNESITE (Dead Burned)
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.

MAGNETIC SEPARATORS—See SEPARATORS (Magnetic)

MAGNETS (Lifting)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland.

MANGANESE METALS
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

MANGANESE ORE
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

METAL (Perforated)—See PERFORATED METAL

METAL CLEANERS
American Chemical Paint Co., Ambler, Pa.

METAL SPECIALTIES AND PARTS—See STAMPINGS

METAL STAMPINGS—See STAMPINGS

METAL WORKING MACHINES—See SHEET METAL WORKING MACHINERY

METALS (Nonferrous)
International Nickel Co., 67 Wall St., New York City.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

MILLS (Blooming, Universal, Plate Sheet, Tin, Bar)—See ROLLING MILL EQUIPMENT

MOLDING MACHINES
Herman Pneumatic Mach. Co., 806 Union Bk. Bldg., Pittsburgh, Pa.

MOLDS (Ingot)—See INGOT MOLDS

MOLYBDENUM
Vanadium Corp. of America, 120 Broadway, New York City.

MONEL METAL (All Commercial Forms)
International Nickel Co., 67 Wall St., New York City.

MONORAIL SYSTEMS
Shepard Niles Crane & Hoist Co., 358 Schuyler Ave., Montour Falls, N. Y. (Shepard Crane & Hoist Div.)

MOTORS (Electric)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Fairbanks, Morse & Co., 900 S. Michigan Ave., Chicago.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland, O., Dept. 20-6.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Reading Iron Co., Reading, Pa.
Youngstown Sheet & Tube Co., The, Youngstown, O.

NAILS (Coated and Galvanized)
Youngstown Sheet & Tube Co., The, Youngstown, O.

NICKEL (All Commercial Forms)
International Nickel Co., 67 Wall St., New York City.

NICKEL (Shot)
International Nickel Co., 67 Wall St., New York City.

NICKEL-CHROMIUM (Shot)
Driver-Harris Co., Harrison, N. J.

NICKEL STEEL (Cold Drawn)
Bethlehem Steel Co., Bethlehem, Pa.

NUTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Ridge Rd., Milldale, Conn.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

OPEN-HEARTH FURNACES—See FURNACES (Open-Hearth)

OVENS (Coke, By-Product Recovery)
Koppers Const. Co., The, 1301 Koppers Bldg., Pittsburgh, Pa.

OVENS (Core and Mold)
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.

OVENS (Japanning, Enameling, Lacquering, Core Baking)
Maehler, Paul Co., The, 2208 W. Lake St., Chicago, Ill.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING

OXYGEN IN CYLINDERS
Linde Air Products Co., 30 E. 42nd St., New York City.

PAINTING (Industrial)
Kiefer Sheeting & Painting Co., House Bldg., Pittsburgh, Pa.

PERFORATED METAL
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago.
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

PICKLING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PICKLING EQUIPMENT
International Nickel Co., 67 Wall St., New York City.

PICKLING MACHINERY
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

PIG IRON
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna Furnace Corp., The, Buffalo, N. Y.
Interlake Iron Corp., Union Trust Bldg., Cleveland, O.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Republic Steel Corp., Youngstown, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Valley Mould & Iron Corp., Hubbard, Ohio.

PIG IRON (Charcoal)
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING (Iron and Steel)
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.

PINIONS—See GEARS AND GEAR CUTTING

PIPE (Brass, Bronze, Copper)
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

PIPE (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Co., Union Trust Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Semet-Solvay Engineering Co., 40 Rector St., New York, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PIPE (Steel & Iron)
American Rolling Mill Co., Middletown, O.

PIPE (Wrought Iron)
Reading Iron Co., Reading, Pa.

WHERE-TO-BUY

PIPE (Wrought Steel)
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

PIPE BENDING
Pittsburgh Piping & Equip. Co.,
43rd St. & A. V. R. R.,
Pittsburgh, Pa.

PIPE FITTINGS
Pittsburgh Piping & Equip. Co.,
43rd St. & A. V. R. R.,
Pittsburgh, Pa.

PIPE LINES (Riveted & Welded)
McClintic-Marshall Corp.,
Bethlehem, Pa.

PIPE MILL MACHINERY
Taylor-Wilson Mfg. Co.,
McKees Rocks, Pa.
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

PIPE STRAIGHTENING MACHINERY
Logemann Bros. Co.,
3126 Burleigh St., Milwaukee.
Taylor-Wilson Mfg. Co.,
McKees Rocks, Pa.

PIPING CONTRACTORS
Pittsburgh Piping & Equip. Co.,
43rd St. & A. V. R. R.,
Pittsburgh, Pa.

PISTON RODS
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.

PLATES (Iron and Steel)
American Rolling Mill Co.,
Middletown, O.
Central Iron & Steel Co.,
Harrisburg, Pa.
Weirton Steel Co., Weirton, W. Va.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Sheared and Universal)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co.,
Harrisburg, Pa.
Granite City Steel Co.,
Granite City, Ill.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Ryerson Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.
Youngstown Sheet & Tube Co., The, Youngstown, O.

PLATES (Terne and Tin)—See TIN PLATE

PNEUMATIC TOOLS—See TOOLS (Pneumatic)

POLES (Tubular Steel)
National Tube Co.,
Frick Bldg., Pittsburgh, Pa.

PRESSES
Cleveland Punch & Shear Wks. Co., The, 3917 St. Clair Ave.,
Logemann Bros. Co.,
Cleveland, O.
3126 Burleigh St., Milwaukee.

PRESSES (Die Cutting)
Logemann Bros. Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Forging)
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.
Mesta Machine Co.,
P. O. Box 1124, Pittsburgh, Pa.
Morgan Engineering Co.,
Alliance, O.

PRESSES (Hydraulic)
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Logemann Bros. Co.,
3126 Burleigh St., Milwaukee.
Mesta Machine Co.,
P. O. Box 1124, Pittsburgh.
Morgan Engineering Co.,
Alliance, O.
Robertson, John, Co.,
133 Water St., Brooklyn, N. Y.

PRESSES (Metal Drawing, Etc.)
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.

PRESSES (Scrap Bundling and Baling)
Logemann Bros. Co.,
3126 Burleigh St., Milwaukee.

PRODUCER GAS SYSTEMS—See GAS PRODUCER PLANTS

PUG MILLS (For Blast Furnaces & Sintering Plants)
Bailey, Wm. M., Co.,
702 Magee Bldg., Pittsburgh, Pa.

PULVERIZING, CRUSHING & GRINDING MACHINERY—See CRUSHING, GRINDING & PULVERIZING MACHINERY

PUMPS
Allis-Chalmers Mfg. Co.,
Milwaukee, Wis.

PUMPS (Centrifugal)
Allis-Chalmers Mfg. Co.,
Milwaukee, Wis.

PUMPS (Hydraulic)
Logemann Bros. Co.,
3126 Burleigh St., Milwaukee.
Roberston, John, Co.,
133 Water St., Brooklyn, N. Y.

PUNCHING AND SHEARING MACHINERY
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.
Thomas Spacing Machine Co.,
Fulton Bldg., Pittsburgh, Pa.

RAILS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.

REAMERS
Morse Twist Drill & Machine Co., New Bedford, Mass.

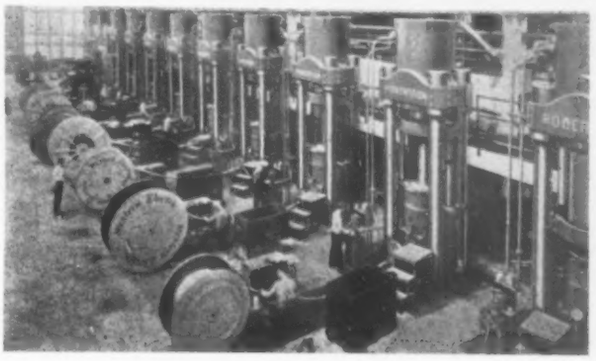
REFRACTORIES—See BRICK, CEMENT FIRE CLAY

REGULATORS (Pressure)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

REINFORCEMENT FABRIC (Electric Welded)
Wickwire Spencer Steel Co.,
41 E. 42nd St., New York City.

RHEOSTATS
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

RINGS (Steel)
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.



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PHOENIX CHILL ROLLS
PHOENIX SAND ROLLS

PITTSBURGH ROLLS CORPORATION
PITTSBURGH, PA.

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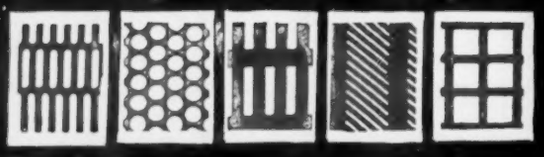
Of Every Sort For Every Use



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SUPERIOR STEEL CORPORATION
Hot and Cold Rolled Strip Steel
in regular carbon steel and rust resisting metals in Chrome and Chrome-Nickel analysis also SuVeneer Metal.
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BILLETS & BLOOMS
REINFORCING
STEEL BARS
LACLEDE STEEL COMPANY
ARCADE BLDG.
SAINT LOUIS, MO.
DISTRICT OFFICES
CHICAGO, DETROIT, KANSAS CITY

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HOT and COLD ROLLED STEEL
For stamping and deep drawing
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Worcester: 316 Park Bldg. The Stanley Steel Co., Ltd., Hamilton, Ont.

HIGH GRADE COLD DRAWN STEELS
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Assured quality and service
Pittsburgh Tool Steel Wire Company
Monaca, Pa.

FOR WELDING
and all other requirements
ALL SIZES — FINISHES
Also Screen Wire Cloth
The SENECA WIRE & MFG. CO.
FOSTORIA, OHIO
*

WHERE-TO-BUY

RIVET SETS AND CHISEL BLANKS

Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.
Hunter Saw & Mach. Co., 5656 Butler St., Pittsburgh, Pa.

RIVETS

Bethlehem Steel Co., Bethlehem, Pa.
Progressive Mfg. Co., Torrington, Conn.
Republic Steel Corp., Cleveland, O.

RODS (Brass, Bronze, Copper)

Revere Copper & Brass, Inc., 230 Park Ave., New York City.

RODS (Drill)

Pittsburgh Tool Steel Wire Co., Monaca, Pa.

RODS (Rounds, Flats & Shapes)

Bethlehem Steel Co., Bethlehem, Pa.
Washburn Wire Co., Phillipsdale, R. I.

RODS (Welding)—See WELDING RODS

RODS (Wire)—See WIRE PRODUCTS

ROLLING MILL BEARINGS

Morgan Construction Co., Worcester, Mass.
Timken Roller Bearing Co., The, Canton, O.

ROLLING MILL EQUIPMENT

Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Co, P. O. Box 1591, Pittsburgh, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., Alliance, Ohio.
National Roll & Fdry. Co., Avonmore, Pa.
United Engr. & Fdry. Co., First National Bk. Bldg., Pittsburgh, Pa.
Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

ROLLING MILLS (Consulting, Contracting Engineers)

McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Morgan Construction Co., Worcester, Mass.

ROLLS (Sand and Chilled)

Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
National Roll & Foundry Co., Avonmore, Pa.
United Engineering & Foundry Co., First National Bk. Bldg., Pittsburgh, Pa.

ROLLS (Steel & Iron)

Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Pittsburgh Rolls Corp., 41st & Willow Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., First National Bk. Bldg., Pittsburgh, Pa.

ROOFING AND SIDING (Corrugated and Plain)

American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

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Kiefer Sheeting & Painting Co., House Bldg., Pittsburgh, Pa.

SAFE ENDS (Boiler Tube)

National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)

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SANDBLAST ABRASIVE (Shot and Grit)

Pittsburgh Crushed Steel Co., 61st & A. V. R. R., Pittsburgh, Pa.

SAND & METALLIC BLAST EQUIPMENT

American Foundry Equipment Co., Mishawaka, Ind.

SASH (Steel)

Truscon Steel Co., Youngstown, O.

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Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

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Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SAWS (Hot & Cold, Tube & Rail)

Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SAWS (Inserted Tooth)

Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SCALES

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Logemann Bros. Co., 3126 Burleigh St., Milwaukee.

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Harrington & King Perforating Co., 5634 Fillmore St., Chicago, Ill.

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Progressive Mfg. Co., Torrington, Conn.

SCREW PLATES

Morse Twist Drill & Machine Co., New Bedford, Mass.

SCREW STOCK—See STEEL (Screw Stock)

SCREWS

Progressive Mfg. Co., Torrington, Conn.

SCREWS (Machine)

Progressive Mfg. Co., Torrington, Conn.

SEAMLESS STEEL TUBING—See TUBES

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Union Drawn Steel Co., Beaver Falls, Pa.

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SHAPES (Steel)—See STEEL (Structural)

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Bliss, E. W., Co., 53rd St., & 2nd Ave., Brooklyn, N. Y.
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Lewis Fdry. & Mach. Co., P. O. Box 1591, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.
United Engr. & Fdry. Co., First National Bk. Bldg., Pittsburgh, Pa.

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Yoder Co., The, W. 55th & Walworth Ave., Cleveland, O.

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SHEETS (Corrugated)

Apollo Steel Co., Apollo, Pa.

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Apollo Steel Co., Apollo, Pa.
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Sharon Steel Hoop Co., Sharon, Pa.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Electrical)

American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.

SHEETS (Galvanized)

American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Hot rolled and Hot rolled annealed)

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American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Apollo Steel Co., Apollo, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Republic Steel Corp., Youngstown, Ohio.
Sharon Steel Hoop Co., Sharon, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

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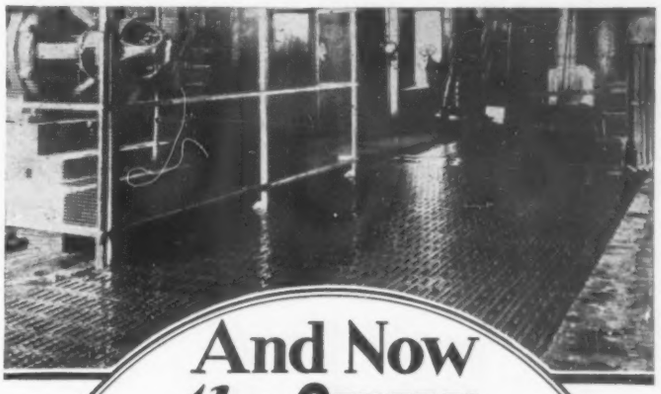
Weirton Steel Co., Weirton, W. Va.

SHEETS (Perforated)

Erdle Perforating Co., 171 York St., Rochester, N. Y.



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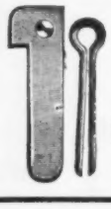
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Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

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Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

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Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Superior Steel Corp. 3122 Grant Bldg., Pittsburgh, Pa.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

STEEL (Alloy)

Bethlehem Steel Co., Bethlehem, Pa.
Heppenstall Co., 47th & Hatfield Sts., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Steel & Tube Co., Canton, O.

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Union Drawn Steel Co., Beaver Falls, Pa.

STEEL (Cold Finished)

Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Union Drawn Steel Co., Beaver Falls, Pa.

STEEL (Corrosion Resisting)

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American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

STEEL (Electric)

Bethlehem Steel Co., Bethlehem, Pa.

STEEL (High Speed)

Bethlehem Steel Co., Bethlehem, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.

STEEL (Open Hearth)

Timken Steel & Tube Co., Canton, O.

STEEL (Open-Hearth—Cold Drawn)

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Union Drawn Steel Co., Beaver Falls, Pa.

WHERE-TO-BUY

STEEL (Rustless)—See STEEL (Corrosion Resisting)

STEEL (Screw Stock)

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Union Drawn Steel Co., Beaver Falls, Pa.

STEEL (Stainless)—See STEEL (Corrosion Resisting)

STEEL (Strip, Copper Coated)

Thomas Steel Co., Warren, O.

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American Steel & Wire Co., 208 S. LaSalle St., Chicago.
American Tube & Stamping Plant, (Stanley Wks.) Bridgeport, Conn.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Republic Steel Corp., Youngstown, Ohio.
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Ryerson, Jos. T., & Sons, Inc., 16th & Rockwell Sts., Chicago, Ill.
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Stanley Works, New Britain, Conn.
Superior Steel Corp., 3122 Grant Bldg., Pittsburgh, Pa.
Thomas Steel Co., Warren, O.
Washburn Wire Co., Phillipsdale, R. I.
Weirton Steel Co., Weirton, W. Va.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

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Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Ohio Structural Steel Co., The, Newton Falls, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell St., Chicago, Ill.
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Truscon Steel Co., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.

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Latrobe Electric Steel Co., Latrobe, Pa.
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STEEL DOORS AND SHUTTERS See DOORS & SHUTTERS

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United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh, Pa.

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Scaife, Wm. B., & Sons Co., Oakmont, Pa.

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TERNE PLATE—See TIN PLATE

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Republic Steel Corp., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown, O.

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Ohio Seamless Tube Co., Shelby, O.
Pittsburgh Steel Co., Union Trust Bldg., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

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Reading Iron Co., Reading, Pa.

TUBING (Alloy)

Ohio Seamless Tube Co., Shelby, O.
Timken Steel & Tube Co., Canton, O.

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National Tube Co., Frick Bldg., Pittsburgh, Pa.
Ohio Seamless Tube Co., Shelby, O
Pittsburgh Steel Co., Union Trust Bldg., Pittsburgh.
Timken Steel & Tube Co., Canton, O.

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Wolverine Tube Co., 1435 Central Ave., Detroit, Mich.

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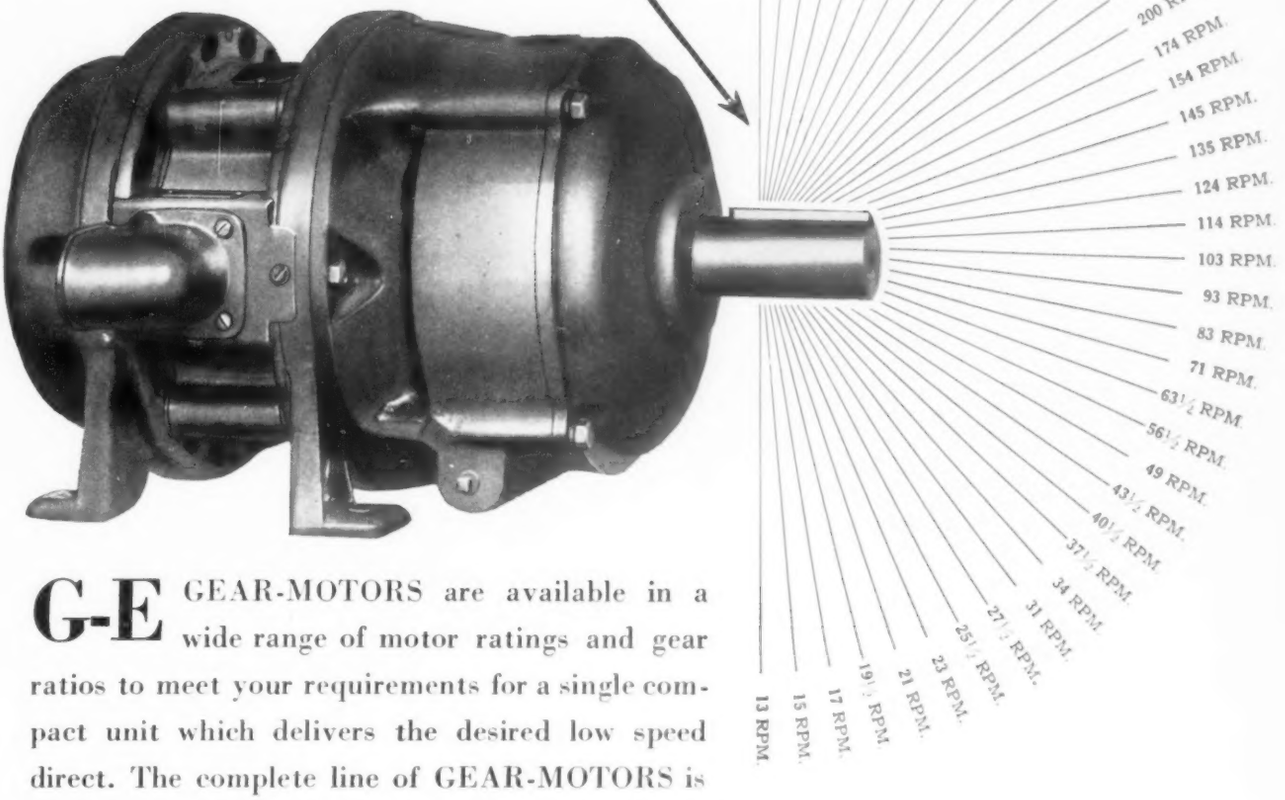

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